REPORT

OF THE

DEPARTMENTAL COMMITTEE

UPON

MERIONETHSHIRE SLATE MINES;

WITH APPENDICES.

Presented to both Houses of Parliament by Command of Her Majesty.

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Report of the Departmental Committee upon the Slate Mines of Merionethshire.

TO THE RIGHT HONOURABLE H. H. ASQUITH, Q.C., M.P., HER MAJESTY'S PRINCIPAL SECRETARY OF STATE FOR THE HOME DEPARTMENT.

SIR, Blaenau Festiniog, 10th December 1894.

IN obedience to the instructions contained in your letters, B. 12,393 HA., of November last year, we have the honour to lay before you a report upon the conditions under which slate is worked in the underground quarries of Merionethshire, with the object of diminishing any proved danger to the life or health of the persons employed.

We have held six sittings for the purpose of taking evidence at Blaenau Festiniog and one at Corris. The sittings were public, and, contrary to the opinion expressed by many at the commencement of the proceedings, a very large amount of evidence was tendered, which is given at length in Appendix I. We were specially anxious that there should be no reason for saying that the inquiry was in any way stifled or incomplete, and if we have erred, it has been on the side of hearing too much rather than too little evidence. Many of the witnesses preferred to speak in Welsh, but their evidence was at once translated into English and taken down by a shorthand writer. All the witnesses have had the opportunity of correcting a printed proof of their evidence, and those who spoke in Welsh have also had the aid of the interpreter who was present at the sittings.

As quarrying slate by the underground method is an industry of comparatively recent date in Merionethshire, and as very little is known about it outside the Principality, we have thought it desirable to enter somewhat fully into details; for otherwise even an experienced miner would scarcely be able to follow our remarks upon the causes of the most common accidents, and our recommendations concerning the best means of preventing them.

We divide our report into the following chapters :—

1. Description of Merionethshire.
2. Mode of occurrence of the Slate.
3. Manner of working the Beds of Slate.
4. Statutes regulating the working of Slate Mines.
5. Nature of the Accidents which occur.
6. Epitome of the Evidence.
7. Visit of the Committee to Belgium and France.
8. Recommendations.

CHAPTER I.

Description of Merionethshire.

Description of Merioneth-shire.

1. The county of Merioneth, as shown by the small index map (Fig. 1), is bounded on the north by Carnarvonshire and Denbighshire, on the east and south-east by Montgomeryshire, and on the south by Cardiganshire; its western shores look on to

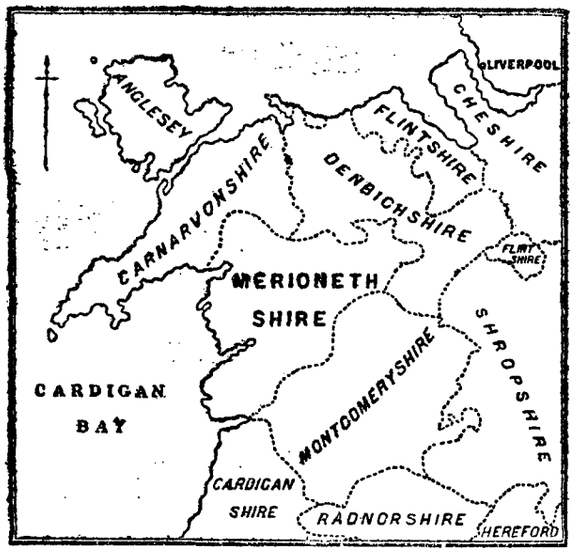


FIG. 1.

Cardigan Bay, and are exposed to the full force of the south-westerly winds coming from the Atlantic. Its greatest length from east to west is about 37 miles, from north to south 33½, and from south-west to north-east 46 miles. Though not containing the highest peaks, it is the most rugged and hilly county in the Principality; a

Altitudes.

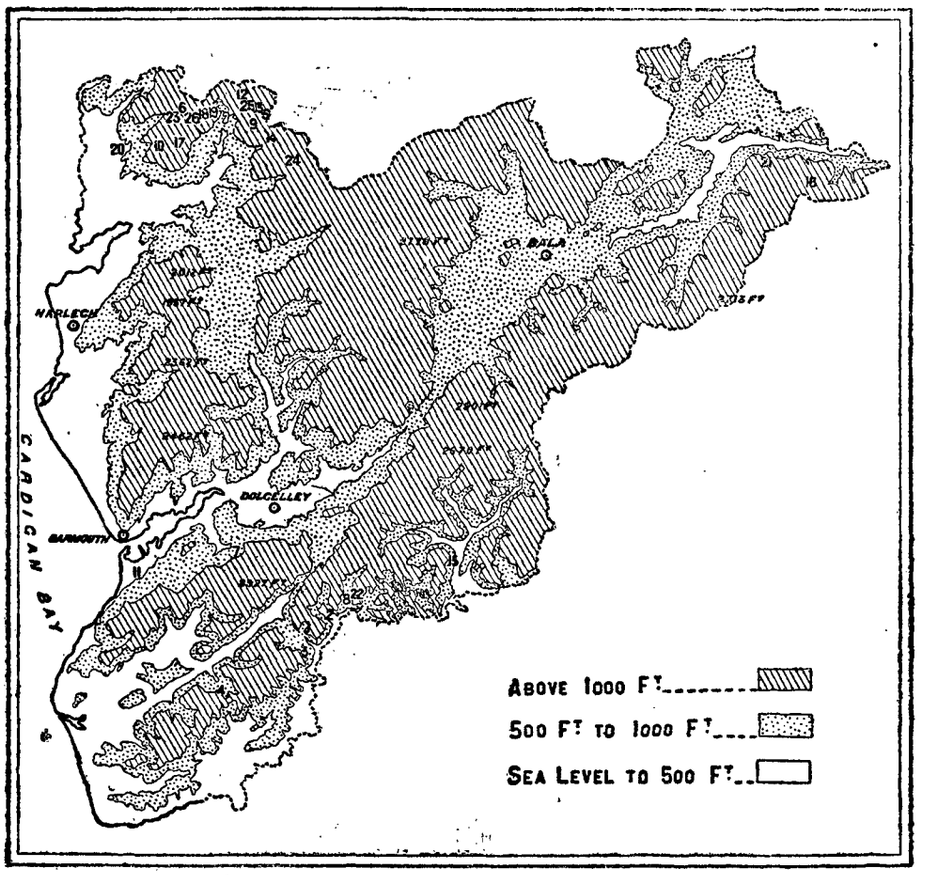


FIG. 2.

glance at the map (Fig. 2) reveals the fact that a large portion of its surface is above the 500-feet contour line; many parts rise above the 1,000-feet contour, whilst several of the mountain tops exceed an altitude of 2,000 feet or even approach 3,000.

The heights of the principal peaks in alphabetical order are:—

TABLE I.

	Height above Mean Sea Level, Liverpool.
	Feet.
Arán Fawddwy	2,970
Aran Benllyn *	2,901
Arenig fawr	2,778
Cader Ferwyn	2,713
Cader Idris	2,927
Craig ddrwg	1,937
Diphwys	2,462
Manod mawr	2,158
Moelwyn	2,527
Rhinog fawr	2,362

2. The county occupies an area of 682 square miles,* as follows:— Area.

	Square Miles.
Land	662
Water	6
Salt marsh	$\frac{1}{7}$
Foreshore	12
Tidal water	2
	$682\frac{1}{7}$

According to the Census of 1891 it has 64,726 inhabitants, of whom 3,959 are stated to be slate quarriers—using the term in its ordinary sense, whilst more than 7,000 are engaged in agriculture. (Appendix III., p. 141.) Population.

3. The high land of Merionethshire naturally has an effect upon the climate, and the quantity of rain falling in the county is far above the average of the United Kingdom. Climate and rainfall.

Thanks to the courtesy of Mr. Robert Roberts, the manager of the Oakeley mines, we are able to give a copy of the records made at his office. (Appendix IV., p. 141.) These show an average rainfall of more than 94 inches annually. The humidity of a climate must be measured, not only by the depth of rain falling, but also by the number of rainy days. When judged by this test, it is again evident that the quarry district has a far moister climate than that of the United Kingdom generally.

That the rainfall at the Oakeley office is by no means exceptional for the slate district, is proved by comparing it with the record of the New Welsh Slate mine, situated in the adjoining Cwmorthin Valley, which has been kindly furnished by Mr. N. F. Robarts.

Without entering into any details concerning the average temperature, we may make the general statement that, owing to its greater altitude, the chief quarry district is decidedly colder than the inhabited parts of the United Kingdom generally. On the other hand, the barrier of hills protects it from the bleak northerly and north-easterly winds which are felt at some of the watering places of Carnarvonshire.

In a few words, the climate of the part of Merionethshire, where most of the slate is mined, may be described as damp and cold.

4. The list of mines given in Appendix V. (p. 142) shows that the most important workings are in the immediate vicinity of the town of Blaenau Festiniog, which may be more correctly described as a horse-shoe shaped village, extending for a distance of three miles from Tan-y-grisiau on the west to Congl-y-wal on the east. The upright figures upon the map (Fig. 2) correspond to the numbers in the list, and indicate the position of the different mines. Situation of mines.

* Ordnance Survey Map of Merionethshire; scale, 2 miles to 1 inch.

CHAPTER II.

Mode of Occurrence of the Slate.

Mode of occurrence of the slate.

5. The slate of Merionethshire is of Silurian age. It occurs in thick beds, locally called "veins," which are interstratified with beds of felspathic ash, generally fine-grained, but sometimes becoming coarse agglomerates. They are known as "hards," and are of considerable importance in furnishing a solid roof for the slate workings. The thickness of the beds worked varies from 30 to 126 feet. In the Festiniog district the beds are dipping at angles varying from about 15° to 35° to the north and north-west, but in other parts of the county the dip of the strata may reach 70° or more.

Cleavage.

6. The dip of the "split" or cleavage is usually greater than that of the stratification; at Festiniog there is a difference of about 15° between the two, as shown in the diagram. (Fig. 3.)

"Pillaring."

7. In addition to its fissility along the cleavage planes, the slate has the property of rending, without great difficulty, along planes at right angles to the cleavage planes. This property of rending or "pillaring" is of the greatest importance to the quarryman, for it enables him to bring down large masses of slate intact with a comparatively small expenditure of labour, and it facilitates the subdivision into blocks suitable for making the various sizes required for the market. The "pillaring" likewise regulates the direction given to the upright masses of slate rock, locally called "walls," which are left for supporting the overlying strata.

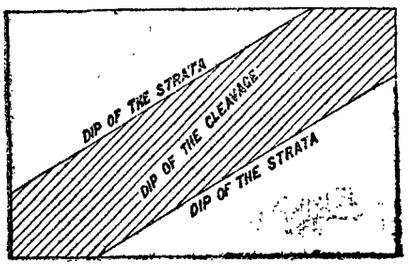


FIG. 3.

Natural joints.

8. Besides the cleavage and the "pillaring," the slate-getter has to consider natural joints, which traverse the bed of slate in various directions. It is unnecessary in this report to give their local names or to point out their various peculiarities; we need only remark that these natural severances may be a source of profit to the slate-getter, when known, by facilitating the process of excavation, and a source of danger, if concealed, by causing unexpected falls of rock. But whether concealed or not they weaken the supporting pillars (*walls*).

The three cross sections (Plates V. and VI.) give a good idea of the principal beds of slate in the Festiniog district. As shown by the sections, the whole of the strata are frequently intersected by dykes of igneous rock, commonly designated as "whinstone."

CHAPTER III.

Method of Working the Slate.

Mode of working.

9. Fifty years ago the slate in the Festiniog district was worked in open quarries; but as their depth increased, the amount of worthless "top," "cover," or "overburden," became so great, that it seemed preferable to resort to underground mining. After a time the managers adopted the system now in vogue in the largest mines, which may be described as working by alternate chambers and long supporting pillars, or "walls," both of which plunge downwards in a direction approaching that of the dip of the strata. The saving in the cost of removing useless overlying rocks has been thought sufficient to compensate for the great loss of slate left in the form of supporting pillars, and for the numerous other disadvantages of working the mineral underground. Looking at the matter by the light of later experience, it seems not improbable that it would have paid in several instances to have gone on longer with the old system of open quarrying.

Festiniog system, and preliminary operations.

10. The present system of working at Festiniog cannot well be made clear without a diagram (Fig 4). An inclined passage A, B, C, D, is sunk along the dip of the bed, and at vertical intervals of about 50 feet, tunnels B, C, D, are driven along the strike. These serve as roads for the transport of the slate and rubbish, and as starting points for the underground chambers. The slate must now be regarded in imagination as

subdivided into horizontal slices 50 feet thick; the slice A, B, F, E, will be worked from the tunnel B, the slice B, C, G, F from the tunnel C, and so on.

CROSS SECTION.

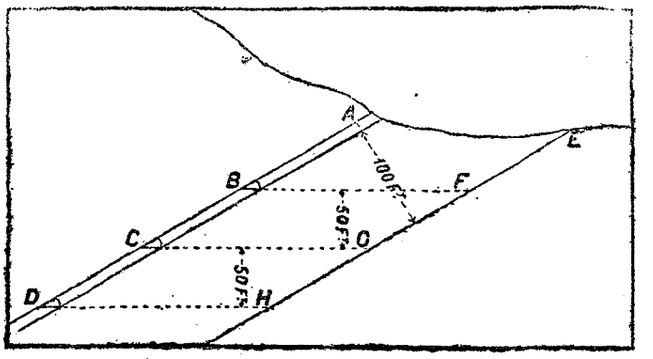


FIG. 4.

PLAN.

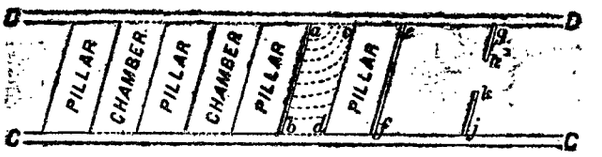


FIG. 5.

We will suppose, for instance, that the incline has reached the point D (Fig. 4), and that a tunnel has been driven out right and left from it along the strike. At intervals of about 70 or 80 feet, inclined passages are excavated along the roof of the slate bed, so as to connect the level D, D (Figs. 4 and 5) with the level C, C, above it. The work is carried on either by excavating upwards from *a*, or downwards from *b*, and most commonly by both processes. The passage (*roof*) serves for ventilating purposes; as soon as it is partly or wholly completed, miners set to work to extend it on one side, as shown by the curved dotted lines, and finally a space is cleared off for a width of 40 feet leaving the part *a*, *b*, *c*, *d*, bare. These preliminary unproductive operations of driving levels, making the connecting passages (*roofs*), and extending them sideways (*widening*), are performed by a class of men known as "miners." While the widening is going on, and after it is completed, the roof of the excavation is carefully examined, and all parts which in any way appear loose, or likely to become loose, are taken down.

Slate-getting.

11. The task of laying the bed bare having been accomplished, the incipient working-place is handed over to two or three slate-getters (*rockmen, creigwyr*, W.), whose business it is to excavate the slate-rock so as to produce the largest quantity of blocks suitable for making the more valuable sizes of roofing material, and to cause the smallest amount of waste. The bed is free upon its upper surface and also where

CROSS SECTION.

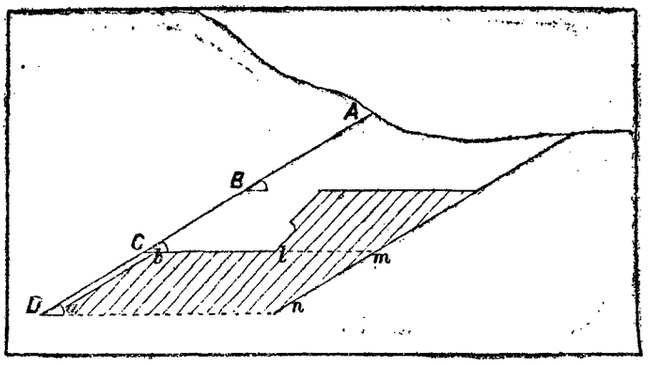


FIG. 6.

the workings upon the floor above have created an open space *b*, *l* (Fig. 6); the part *b*, *m*, *n*, *a* has to be removed piece by piece, beginning at the roof, until the whole has been cleared out. The common method consists in taking off slice after slice

parallel to the cleavage; but if there are well-marked "slants," *i.e.*, planes of severance more or less parallel to the stratification, they may be chosen for the bounding planes of the slice (*thickness, tew*, W.). The slice is held fast by the sides and more or less tightly at the bottom. In order to have means of removing it piecemeal, a trench or channel (*free side*) is excavated by blasting along the inclined face, either on one side or in the middle of the proposed chamber. At the bottom natural joints are often found which give means of release; but if no suitable joints exist, the slice has to be cut across along the floor of the chamber by blasting, or even by chiselling, and a *free bottom* obtained. Block after block of workable slate can now be torn off by "pillaring" holes bored at right angles to the cleavage planes. They are charged with fine gunpowder to within half an inch of the top and lightly tamped. As the explosive exerts its influence along the whole length of the hole, and as the rock will rend easily in the direction of the "pillaring," the block is simply severed and not smashed. Sometimes the force of the explosion is insufficient to detach the block and simply produces a crack. In a case of this kind the slate-getter pours powder into the hole, or into the crack, if it is wide enough, and fires this second charge, which may be from 3 to 10 lbs. of powder. The block is generally completely set free by the explosion, though occasionally a third or fourth charge may be required.

"Pillaring" holes.

"Second blasts."

We have entered somewhat into detail with regard to "pillaring holes" and "second blasts," as many of the accidents happen in connexion with them.

The original trench (*free side*) is widened out by the removal of block after block of slate, until the working face (*bargain*) has been brought to the line *a b* on one side, and *c d* on the other (Fig. 5), which coincide with the pillaring planes. After one inclined slice (*thickness, tew*, W.) has been taken off, the next is removed in like manner; a trench (*free side*) is once more blasted out, and blocks are severed by pillaring holes. In this manner, beginning from the upper side *a b* (Fig. 6) the bed is gradually removed piecemeal until eventually everything is cleared away to the underlying rock *m n*.

Lean of pillars.

12. Owing to the manner in which the slate rends (*pillars*) most easily, the direction of the masses left for supports (*walls*) deviates somewhat from the line of greatest dip, whilst the sides are in many cases far from being perpendicular.

The two facts are made plain by the plan (Fig. 5), and the longitudinal section (Fig. 7); and it is therefore evident that the shape of the pillars (*walls*) is not the one which will best conduce to the support of the overlying strata.

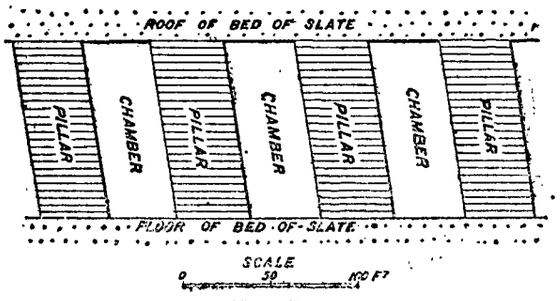


FIG. 7.

Supporting chains.

13. For assistance in climbing up the rugged slope of the working face (*bargain*) the slate-getter (*rockman*) has a chain fastened upon the floor above, which he twists round one thigh while at work. When boring a pillaring hole with a "jumper," he generally stands upon a piece of timber or a plank held up by a couple of iron pegs inserted into holes in the working face. (Plate II., Fig. 3.)

Height of the chambers.

14. As only two or three men are employed in a chamber, the work of removing the mass of slate before them lasts for several years. Cases might be cited in which the same men have worked even 10 years in one and the same chamber, and on one and the same floor. As the work proceeds they gradually lose touch with the roof, and finally may find it considerably more than 100 feet above their heads; in fact, during a large portion of the life of a working place, the roof and sides are quite inaccessible without the aid of ladders. (Plate III., Figs. 5 and 6.)

Light.

The only light used in the actual "getting" is that of a tallow candle held in a lump of clay.

Loading.

15. The masses of slate brought down by the blasts are mostly too large for handling, and have to be subdivided into blocks weighing from 1 cwt. to $2\frac{1}{2}$ tons. A chain is put round the block as it lies near the working face, and it is dragged

away by a crane and loaded on to a trolley (*sled*), which is trammed out to the surface or to the nearest incline. The rubbish, consisting of small pieces of slate and worthless rock, is loaded into waggons and trammed out in the same way. (Plate II., Fig. 4.) Cranes.

The work of slate-getting is precisely the same, chamber after chamber, and it must be understood that there may be several gangs upon the same floor, each chamber or opening (*agor*, W.) being separated from the adjoining one by a mass of rock (*pillar* or *wall*) some 40 feet thick (Plate IV., Fig. 7). Each chamber may have a gang upon each floor; the workings at floor B (Fig. 6), for instance, being further advanced than the workings upon floor C, and those upon floor C having extended further towards the underlying rock than those at D, and so on.

16. In the work of getting slate, gunpowder only is used, as it will sever without smashing. For preliminary work, such as driving levels, making "roofs," and cutting "free side," gun-cotton and the various nitro-glycerine explosives are employed by the miner and the rockman to a certain extent. Explosives.

17. We have now followed the block of slate until it has been trammed to an incline; the trolley is hooked on to a wire rope and drawn to the surface by steam or water power. It at once goes to the "mill," as the dressing shed is called, and is made either into roofing material or into slabs for cisterns, billiard tables, &c. Conveyance to the surface.

When roofing slates are made, the block is split into slabs, about 3 inches thick, by the surface workers (*quarrymen*, *chwarelwyr*, W.), who are in partnership with the underground slate-getters; the slabs are then cut into suitable lengths by means of circular saws travelling at a slow speed (Plate IV., Fig. 8). The sawn lumps are split by thin chisels into sheets one-sixth to one-eighth of an inch thick, and finally dressed into the rectangular pieces which are so familiar throughout the country. As a rule, the dressing is done in Merionethshire by mechanical knives and not by a hand-tool. Sawing.

Greaves' machine, which is one of the commonest, consists of a revolving blade acting like a long chopper, while the sheet of slate rests upon a fixed knife-edge (Plate I., Fig. 2). The piece of slate is held against one of the notches of a projecting gauge attached to the machine, and the workman decides at a glance how to cut it to the best advantage. Each side of the rectangle has to be cut separately. Dressing.

Slabs for cisterns, &c., are made by splitting the large blocks into pieces of suitable thickness, and these are planed smooth by machines identical in principle with those used in engineering shops. The sides are sawn by circular saws.

CHAPTER IV.

Statutes Regulating the Working of Slate Mines.

18. The Acts of Parliament which regulate the working of slate mines are: Metalliferous Mines Regulation Acts.

1. The Metalliferous Mines Regulation Act, 1872.
2. The Metalliferous Mines Regulation Act, 1875.
3. The Slate Mines (Gunpowder) Act, 1882.
4. The Factory and Workshop Acts, 1878 to 1891.

The first of these Acts applies to all mines not comprised by the Coal Mines Regulation Act, which includes mines of coal, stratified ironstone, shale, and fireclay. When the Inspector of Mines first endeavoured to enforce the Metalliferous Act in Merionethshire, he was met with the objection that the workings were "quarries" not "mines," and that consequently they were in no way subject to a statute framed, according to its title, for "Metalliferous mines." It was not until the matter had been brought before the Court of Queen's Bench that the owners gave in. The judge decided that the workings were legally "mines," and that the title "Metalliferous Mines Regulation Act" in no way modified the meaning of section 3.

Since that decision, in 1875, the Act has been enforced by the Inspectors of Mines. Special Rules under the Act were established at all the slate mines in the year 1879. A new code has been introduced in all the mines which have received exemptions from the gunpowder rules of the Statute. Special Rules.

The Metalliferous Mines Regulation Act of 1875 simply refers to the date for sending in the annual return of persons employed and mineral raised.

19. The Slate Mines (Gunpowder) Act was passed in 1882 in order to relieve the slate mines from the section in the 1872 Act which forbids the introduction of explosives into the mine in cases containing more than 4 lbs. each. The owners of some of the slate mines complained that the Metalliferous Mines Act had been passed Slate Mines (Gunpowder) Act.

without their needs having been taken into consideration; they urged that quantities of gunpowder exceeding 4 lbs. were often required at very short notice for "second blasts," and that it was safer to carry the powder underground in the casks supplied by the makers than in tin canisters. Power is now given to a Secretary of State to exempt slate mines from sub-section 2 of section 23 of the Act. Most of the large slate mines in the Festiniog district have received exemptions; but these are coupled with stringent Special Rules framed with the object of preventing, as far as possible, danger from opening kegs of gunpowder by artificial light and pouring it into the horns or other receptacles in which it is taken to the working face.

Factory and Workshop Acts.

20. The Factory and Workshop Acts apply to the mills where the slate is split and dressed, for these come within the definition of "pitbanks" in the Fourth Schedule of the 1878 Act. They regulate the employment of boys, and impose upon the owner the obligation of fencing his machinery, providing proper sanitary accommodation, and preventing dust. Strictly speaking, the mills have, therefore, been under the supervision of two inspectors, each enforcing his own Act. This system of twofold inspection is unreasonable and unnecessary; it is satisfactory to note that it will shortly be given up.

CHAPTER V.

ACCIDENTS.

Accidents.

21. Appendix VII. (p. 143) contains a list of all the fatal accidents which have taken place in the Merionethshire slate mines during the last nineteen years. They are classified according to place of occurrence and according to cause, in the manner which is customary in the reports of the Inspectors of Mines.

During the last nineteen years there have been 147 separate fatal accidents, causing the loss of 163 lives, and the general results may be summed up as follows:—

TABLE II.

FATAL ACCIDENTS in the MERIONETHSHIRE SLATE MINES.

(1875 to 1893, both years inclusive.)

			Number of Deaths.	Per-centage of the Total Number of Deaths.
Below ground.		Explosions of fire-damp	—	—
		Falls of ground	65	39·9
	In Shafts.	Overwinding	—	—
		Ropes and chains breaking	—	—
		Whilst ascending or descending by machinery	—	—
		Falling into shaft from surface	—	—
		Things falling from surface	—	—
		Falling from part way down	1	0·6
		Things falling from part way down	—	—
		Total in shafts	1	0·6
	Miscellaneous Underground.	Explosions of gunpowder, &c.	14	8·6
		Suffocation by gases	—	—
		Irruptions of water	—	—
		Falling into water	—	—
		On inclined planes	8	4·9
		By trams and tubs	1	0·6
		By machinery underground	7	4·3
		Sundries underground	36	22·1
		Total miscellaneous underground	66	40·5
Above ground		By machinery on surface	6	3·7
		Boilers bursting	4	2·4
		Miscellaneous on surface	21	12·9
		Total on surface	31	19·0
		Gross total	163	100·0

22. This table serves to emphasise the fact, so well known to all persons engaged in mining, that a very large proportion of the accidents are caused by falls of ground. Falls of ground.

It must be remarked that under this head are comprised two very distinct kinds of accidents:—

(*a.*) Falls from the roof or side from places far beyond the workman's reach.

(*b.*) Falls which happen during the process of getting the slate.

(*a.*) The explanations given in Appendix VII., which are copied from the official reports, do not always state distinctly under which of these two sub-heads the casualty should be placed; however, it is evident from the statistics of the last ten years, that many of the deaths were due to pieces of rock which dropped from considerable heights. Accidents of this kind are inseparable from the present method of working. The roof and sides of a chamber may be perfectly strong and sound when left by the *miners* and the *rockmen*, but they are likely to become less and less safe as time goes on. Can it surprise anyone, after the lapse of years, when air and moisture have penetrated into the joints of the rock, that pieces gradually become loose and finally fall? Besides, in addition to natural earth-tremors, the roof and sides of the chambers are made to quiver day after day, and year after year, by the constant blasting. The marvel is, not that accidents happen, but that they are so few in number. In reality the list of casualties in no way represents the actual number of falls which have taken place unexpectedly; it simply marks the cases in which a man happened to be in the way. Of the hundreds of narrow escapes there is no record. As a rule there are only four or five persons working in a chamber, and consequently the chances are against anybody being directly in the line of fall. Falls of roof and side from places beyond the workmen's reach.

Systematic "sounding" will often reveal dangers not apparent to the eye, but the test is not infallible. If the loose piece of rock is small, it emits a dull or hollow sound when struck with the hammer; on the other hand, large masses weighing several tons often fail to give any indication of danger when tested in this manner. The workman is thus lulled into a false sense of security, and has no idea of peril until after the catastrophe has taken place.

(*b.*) Falls of rock from the working face can never be avoided altogether. Even with sunlight to aid him, the workman will not always discover concealed joints; and when the examination has to be made by the dim glimmer of a tallow dip, the difficulty of the task and the chances of a mistake are very largely increased. The result is that pieces which look safe may be unstable and fall when least expected. The huge size of some of the blocks wrenched off by blasting is a further obstacle in determining whether or no they are dangerously loose. In order to ascertain how best to remove them, the workman may have to stand in places where he is threatened by their fall. In other cases, suspended on the face of his bargain by a chain, the *rockman* uses a crowbar to prize off a block loosened by a blast (Plate II., Fig. 3); if the block in sliding down happens to swerve but a little from its expected path, he may be caught and badly injured. Falls of rock from the working face.

A third cause of accident to the slate-getter is returning too soon after firing a shot. It is well-known that the full effects of the charge are not always felt immediately. Parts of the "burden" of the hole may be completely detached and thrown down at once, whilst others, though tottering, do not finally fall until after the lapse of some time. Many mishaps would have been avoided if men had waited before going back to the working face after blasting; and it is advisable, wherever possible, to approach the working face from above and not from below.

23. The immunity from shaft accidents is easily explained; the slate is usually brought to the surface by inclines or through adits, and the workmen therefore escape certain risks which pursue the collier and the ore-miner. A few accidents have happened in small shafts connecting parts of the workings. Shaft accidents.

24. The miscellaneous accidents underground fill a long list; four principal subdivisions have to be considered, viz.: Miscellaneous accidents.

(*a.*) Explosions of gunpowder, &c.
(*b.*) On inclined planes.
(*c.*) By machinery underground.
(*d.*) Sundries underground.

25. Considering the very large quantities of explosives used daily, and the fact that much is loose gunpowder, the list of fatalities is not so great as one would expect. The quantity of explosives consumed annually at the Oakeley mines amounts to 60 tons of gunpowder, 14 tons of gelignite, and 5 tons of gun-cotton. On the whole, Blasting accidents.

therefore, it cannot be said that the men are careless in performing the various operations connected with blasting.

Accidents upon inclined planes.

26. The accidents upon inclined planes point to the desirability of having special pathways for the men away from the slate traffic (Plate I., Fig. 1), and of prohibiting riding upon waggons.

Accidents by machinery underground.

27. Accidents with cranes are not uncommon; the list simply shows those which resulted in death. What is commonly known as a crane in Festiniog is a four-legged derrick with a crab winch. It is used for loading blocks of slate on to trolleys (*sleds*) (Plate II., Fig. 4). The block is raised by a couple of men, one at each handle, the trolley is run underneath and the block lowered. It is during the lowering process that the accidents most frequently happen, when one man is at the winch. From some cause or other he lets go the handle, which is then whirled round rapidly and strikes him on the face. Sometimes a block which is partly resting upon the trolley or upon the ground gives an unexpected lurch, and so causes a fatal jerk.

Sundry accidents underground.

28. The accidents classified under the heading "Sundries underground" may be due to a great variety of causes. In the early years of inspection there were many falls over underground precipices. Thanks to the special rule which compels fencing, the most dangerous places are nowadays protected. The worst accident upon the list, which resulted in the loss of five lives, was due to the giving way of an underground bridge, which the men had overloaded with their waggons.

Surface accidents.

29. The accidents at the surface call for no special comment. We need only remark that some of them occurred in quarrying operations above ground and therefore resemble in their nature the underground casualties.

Risks of slate mining.

30. This bare record of the number and nature of the accidents is not enough to give a true idea of the risks incident to slate-mining. It is necessary, in addition, to ascertain the ratio between the number of the casualties and the number of the persons employed, and then compare the figures so obtained with the ratios which prevail in other forms of mining and in other industries.

The accompanying Table III. shows that for the nineteen years under consideration the average annual death-rate from accidents was as follows:—

Per 1,000 persons employed	under ground	- .	- 3·23
„ „ „	above ground	-	- 0·70
„ „ „	below and above ground		- 1·94

TABLE III.

MERIONETHSHIRE SLATE MINES.

Year.	Below Ground.			Above Ground.			Totals below and above Ground		
	Number of Persons employed.	Deaths from Accidents.	Death-rate per 1,000 Persons.	Number of Persons employed.	Deaths from Accidents.	Death-rate per 1,000 Persons.	Number of Persons employed.	Deaths from Accidents.	Death-rate per 1,000 Persons.
1875	1,825	8	4·38	2,202	5	2·27	4,027	13	3·22
1876	1,956	5	2·55	2,359	—	—	4,315	5	1·15
1877	2,216	15	6·76	2,598	3	1·15	4,814	18	3·73
1878	2,222	5	2·25	2,371	1	0·42	4,593	6	1·30
1879	2,151	2	0·93	2,278	3	1·31	4,429	5	1·12
1880	2,293	7	3·05	2,359	3	1·27	4,652	10	2·15
1881	2,356	8	3·39	2,442	3	1·22	4,798	11	2·23
1882	2,456	6	2·44	2,463	5	2·03	4,919	11	2·23
1883	2,362	5	2·11	2,312	—	—	4,674	5	1·07
1884	2,273	10	4·40	2,275	3	1·31	4,548	13	2·85
1885	2,348	8	3·40	2,262	—	—	4,610	8	1·73
1886	2,202	6	2·72	2,187	2	0·91	4,389	8	1·82
1887	2,171	5	2·30	2,210	—	—	4,381	5	1·14
1888	2,080	11	5·28	2,289	—	—	4,369	11	2·51
1889	2,089	7	3·35	2,178	1	0·46	4,267	8	1·87
1890	2,187	7	3·20	2,064	—	—	4,251	7	1·64
1891	1,888	5	2·64	1,942	—	—	3,830	5	1·30
1892	2,043	7	3·42	1,926	1	0·52	3,969	8	2·01
1893	2,105	6	2·85	2,216	—	—	4,321	6	1·39
Totals and averages for the 19 years	41,223	133	3·23	42,933	30	0·70	84,156	163	1·94

31. Table IV. enables us to compare these death-rates with similar ratios at other classes of mines. It shows that, taking all the persons employed, both above and below ground, the occupation of the Merionethshire men is more risky than that of the average miner of the United Kingdom, but less hazardous than that of the South Wales and of the Cleveland men. If the figures for the underground workers are taken separately, the dangers of the Merionethshire mines become still more marked, for in only two cases do we meet with ratios exceeding their average of 3·23 per 1,000; one of these refers to a single and very exceptional year. On the other hand the workers at the surface, who form more than 50 per cent. of the total number employed, enjoy exceptional immunity from accidents compared with their fellows at collieries in South Wales or iron mines in Cleveland. Comparison with other kinds of mines.

Table IV.

Table of Death-rates.

Period.	All the Mines of the United Kingdom classed under the Coal Mines Regulation Act.			All the Mines of the United Kingdom classed under the Metalliferous Mines Regulation Act.			All the Mines in the South Wales, No. 13, District.			All the Mines under the Metalliferous Act in Cornwall, Devon, Dorset, and part of Somerset.*			Ironstone Mines of the Cleveland District.		
	Annual Death-rate from Accidents.			Annual Death-rate from Accidents.			Annual Death-rate from Accidents.			Annual Death-rate from Accidents.			Annual Death-rate from Accidents.		
	Per 1,000 Persons employed below ground.	Per 1,000 Persons employed above ground.	Per 1,000 Persons employed below and above ground.	Per 1,000 Persons employed below ground.	Per 1,000 Persons employed above ground.	Per 1,000 Persons employed below and above ground.	Per 1,000 Persons employed below ground.	Per 1,000 Persons employed above ground.	Per 1,000 Persons employed below and above ground.	Per 1,000 Persons employed below ground.	Per 1,000 Persons employed above ground.	Per 1,000 Persons employed below and above ground.	Per 1,000 Persons employed below ground.	Per 1,000 Persons employed above ground.	Per 1,000 Persons employed below and above ground.
Average for the 10 years, 1873–1882.	2·57	·92	2·24	2·35	·58	1·62	3·33	1·15	2·96	2·63	·56	1·64	2·66	1·36	2·41
Average for the 10 years, 1883–1892.	2·01	·96	1·81	2·14	·39	1·44	3·04	1·54	2·82	2·54	·37	1·51	2·21	1·23	2·04
1893 -	1·71	·90	1·55	2·02	·20	1·78	2·85	1·48	2·64	5·73	·18	3·22	2·16	—	1·71

* The figures for 1873 to 1892, both inclusive, relate to the old No. 14 District, consisting of Cornwall, Devon, Dorset, and part of Somerset. The figures for 1893 relate to the present No. 12 District, which includes other counties. The high death-rate for that year is due to a loss of 20 lives by one accident in Cornwall.

32. The comparison of the mortality rates at the Merionethshire slate mines with those of British mines generally, and with that of the South Wales District in particular, is shown graphically by Figures 8, 9, and 10 (pages xviii and xix). Graphic comparison of death-rates.

FIG. 8.

DIAGRAM SHOWING DEATH-RATES FROM ACCIDENTS OF UNDERGROUND WORKERS,

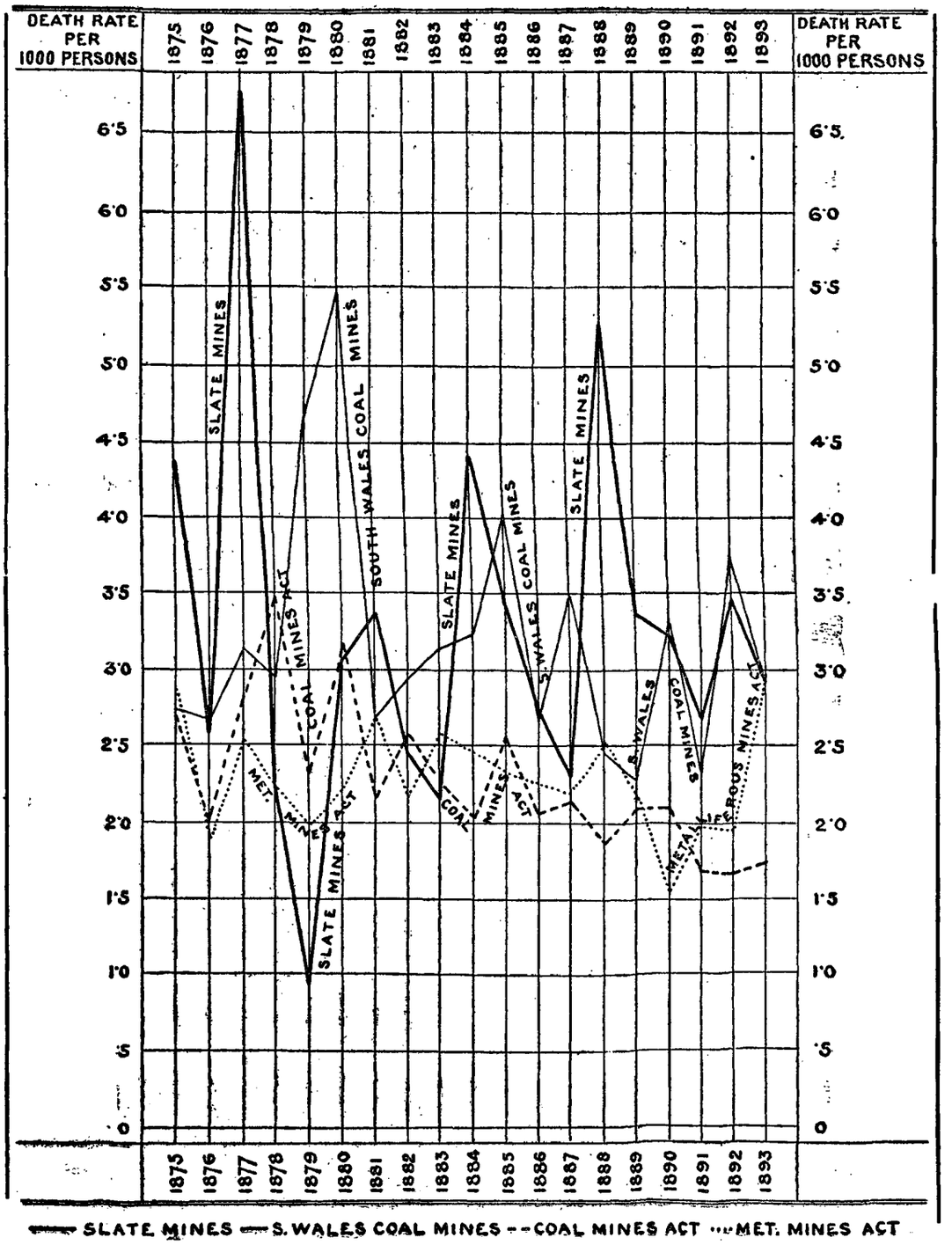


FIG. 9.

DIAGRAM SHOWING DEATH-RATES FROM ACCIDENTS OF SURFACE WORKERS.

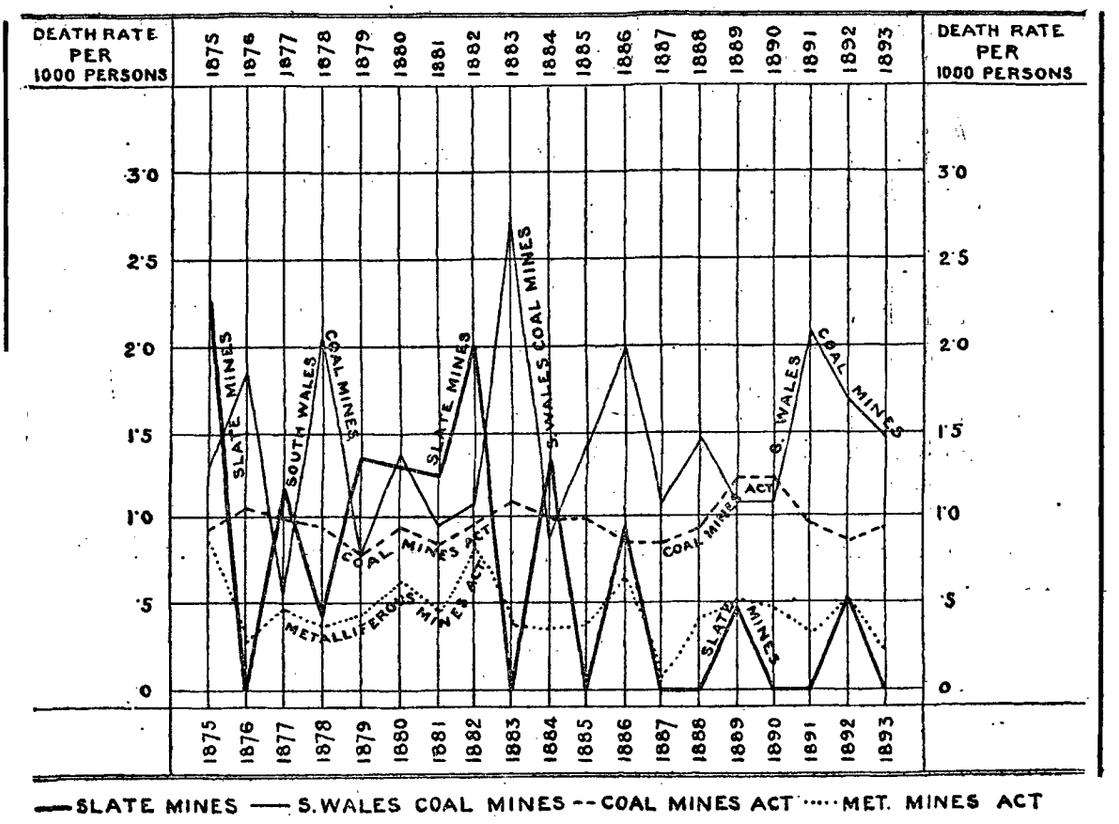
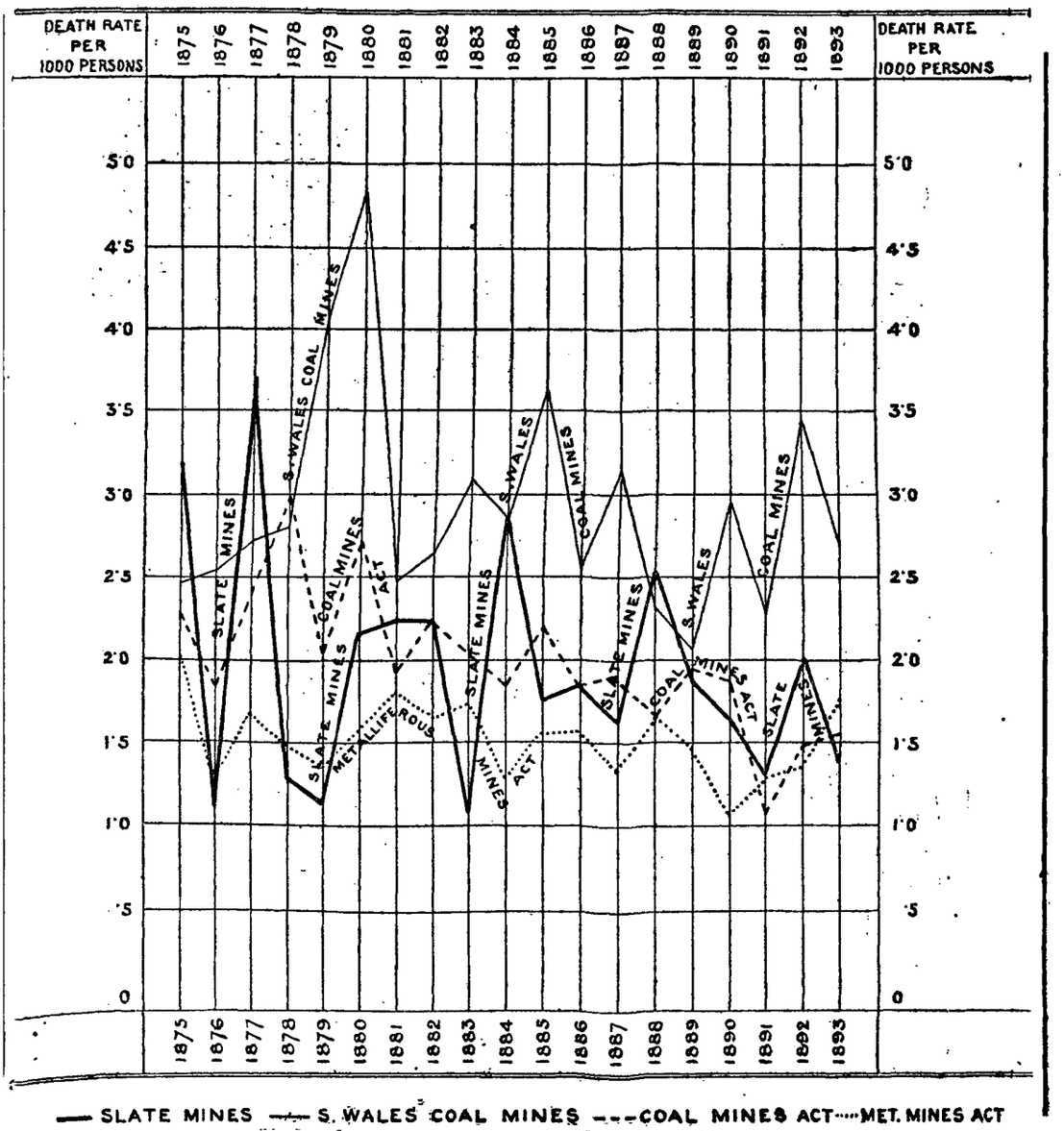


FIG. 10.

DIAGRAM SHOWING DEATH-RATES FROM ACCIDENTS OF ALL PERSONS EMPLOYED, BOTH ABOVE AND BELOW GROUND.



Comparison with other industries.

33. Table V. shows death-rates from accidents among men employed in certain open quarries, in two great engineering undertakings, upon railways and at sea; and the following conclusions may be drawn :—

(1.) The Carnarvonshire open slate quarries on the whole, thanks to the remarkable freedom from accidents at Penrhyn and Dinorwic, are safer than the Merionethshire underground quarries; but if Penrhyn and Dinorwic are excluded, the Carnarvonshire death-rate becomes much higher than that of Merionethshire.

(2.) More lives were lost, per 1,000 employed, in making the Manchester Ship Canal and the Tower Bridge than in mining and dressing slate in Merionethshire.

(3.) Many railway servants, such as brakesmen, goods-guards, and shunters, compare unfavourably even with the underground workers of Merionethshire.

(4.) The death-rate from accidents among the crews of British merchant ships is from four to seven times as high as that of the workers at the Merionethshire slate mines.

Therefore, without wishing in any way to underrate the risks run by the Merionethshire men, it is our duty to point out that they are better off than several other classes of workmen.

TABLE V.

Industry.	Years to which the Figures relate (in all Cases inclusive).	Average Annual Death-rate from Accidents per 1,000 Persons employed.
Quarrying.		
*Open slate quarries in Carnarvonshire	1883–1892	1·53
*Penrhyn Slate Quarry, near Bangor	,, ,,	0·76
*Dinorwic Slate Quarry, near Llanberis	,, ,,	0·71
*Open slate quarries in Carnarvonshire, omitting Dinorwic and Penrhyn	,, ,,	2·82
*Stone quarries, Carnarvonshire	,, ,,	1·30
Engineering.		
†Construction of Manchester Ship Canal	1887–1892	2·48
‡ ,, Tower Bridge, London	1886–1894	2·90
Railways.		
§Railway servants of the United Kingdom (accidents in which the movement of vehicles was concerned).	1870, 1873, 1877, and 1880–1892.	1·48
‖(*a.*) Brakesmen and goods-guards	1884–1893	5·27
(*b.*) Permanent-way men	,, ,,	2·37
(*c.*) Engine drivers	,, ,,	1·60
(*d.*) Porters	1887–1893	1·49
(*e.*) Shunters	,, ,,	5·41
(*f.*) Passenger guards	1884–1893	1·02
Average of the six occupations *a, b, c, d, e, f*	,, ,,	2·27
¶All the railway servants in the United States	Year ending 30th June 1890.	3·27
Railway servants in the United States engaged directly in handling trains, viz., engine-drivers, firemen, guards, and other train-men.	,, ,,	9·52
Shipping.		
**Crews of British merchant ships registered in the United Kingdom	1871–1880	13·45
,, ,, ,, ,,	1881–1890	11·04
,, ,, ,, ,,	1891	8·67
,, ,, ,, ,,	1892	8·36

* Report of Quarry Committee of Inquiry. Parliamentary Paper C.—7237, 1894, Appendix II., pp. 4, 5, and 6.
† Letter from the Secretary of the Company to the Board of Trade, "The Times," 21st November 1892.
‡ Construction of the Tower Bridge (Accidents). Parliamentary Paper 318, 1894.
§ Railway Companies (Injuries to Servants). Parliamentary Paper 502, 1894.
‖ General Report of the Board of Trade upon the Accidents on Railways of the United Kingdom during the year 1893. Parliamentary Paper C.—7523, 1894, p. 17, and corresponding reports for previous years.
¶ H. C. Adams, "The Forum," vol. xiii., 1892, p. 500.
** Loss of Life at Sea. Parliamentary Papers C.—3875, 1884; 150, 1891; 342, 1892; 32, 1894.

CHAPTER VI.

Epitome of the Evidence.

34. Fifty-three persons gave evidence before the Committee, viz., 3 medical men, 10 employers or agents, 36 workmen, 3 instructresses of cookery, 1 surveyor to a Local Board. Witnesses.

The evidence brought before us by the medical men was of the utmost importance, for their long experience in the district and their thorough familiarity with the subject in hand entitle their opinions to the greatest respect. Evidence of medical men. R. Jones, 1-193, 2052-2107. R. Roberts, 1046-1141. R. D. Evans, 1645-1733.

35. Dr. Richard Jones, after examining the death-registers of the district, came to the following conclusions:— Dr. Richard Jones' conclusions.

i. The Festiniog quarryman* enjoys longer life than the average stone and slate quarrier throughout England and Wales.

ii. The death-rate from phthisis in the district is lower among the slate quarriers than among the non-quarriers.

iii. The death-rate from phthisis is higher among those engaged in the slate mills than among the under-ground workers (*rockmen* and *miners*).

iv. Pneumonia is the most common disease from which the Festiniog quarryman suffers, and the death-rate from this disease is higher among the quarriers than among the non-quarriers of the district.

v. The Festiniog quarryman dies from accidents at a higher rate than stone and slate quarriers as a class.

vi. Excluding accidents, the mean age at death of quarrymen is higher by one year than that of the tradesmen of the district.

vii. Including accidents, the mean age at death is one year lower than that of the tradesmen of the district.

viii. The Festiniog quarryman dies from diseases of the digestive system at a higher rate than males of the same age throughout England and Wales, and also than stone and slate quarriers as a class.

36. All three medical men agreed that the complaints from which the quarrymen most commonly suffer are— Commonest diseases of quarrymen. R. Jones, 64. R. Roberts, 1052. R. D. Evans, 1648.

i. Diseases of the respiratory organs, especially pneumonia.

ii. Rheumatism and all its complications.

iii. Indigestion.

37. We were anxious to ascertain how far these diseases were due to local conditions of climate or mode of living, and how far they should be attributed to the nature of the employment. The doctors considered that the cold damp climate of the Festiniog district was an important factor in causing rheumatism and diseases of the respiratory organs; they told us that many of the houses are damp, both from standing upon undrained land and from the absence of a damp-proof course or water-tight layer between the foundations and the superstructure. They were unanimous in condemning the present barracks on account of overcrowding, dirt, and absence of proper sanitary arrangements. Damp houses. R. Jones, 21, 54, 2063. R. Roberts, 1052. R. D. Evans, 1686. R. Jones, 54, 86, 2063. R. Roberts, 1052. Barracks. R. Jones, 70, 71, 77. R. Roberts, 1059. R. D. Evans, 1648.

38. The diet of the men is far from being all that the doctors would desire; they take too little nitrogenous food, and drink too much stewed tea. Indigestion and nervous debility are both ascribed to the tea drinking, though excessive smoking may likewise account to some extent for the latter form of disease. Diet. R. Jones, 64-9, 182-185. R. Roberts, 1052. R. D. Evans, 1710.

39. With the nature of the clothing the medical men find no fault, as flannel is commonly worn next the skin; but they point out that the underclothing should be changed more often than it is, and that more frequent ablutions are indispensable. Wearing the same shirt by day and by night for two weeks or more at a time is an unhealthy practice which is not uncommon. Clothing. R. Jones, 69. R. Roberts, 1052. R. D. Evans, 1649.

40. As an instance of what can be done by improved sanitary conditions, Dr. Richard Jones told us that the introduction of a supply of pure water reduced the number of deaths in the Festiniog district from typhus and typhoid fevers from 12·69 per annum during the 10 years 1865 to 1874 to 1·3 per annum during the 10 years 1880 to 1890. Sir George Buchanan and others have proved that the death-rate from consumption is immensely reduced in towns by the introduction of a proper system of subsoil drainage. Advantage of good water supply. R. Jones, 111. R. Jones, 54,

* The term "quarryman" is used here in its ordinary sense of any person employed in or about a quarry; with one exception, all the Festiniog quarries are worked underground, and, as already stated, are legally mines.

Pneumonia due to chills.
R. Jones, 165, 166. 2062.
R. Roberts, 1052.
R. D. Evans, 1648 and 1664.

41. Respecting the influence of the employment upon the health, all three doctors agreed that the pneumonia, which is so prevalent among the underground men, is largely due to chills contracted during work or during journeys to and from Festiniog. According to Dr. Richard Jones, the death-rate from phthisis of those who work in the mills is higher than that of those who work underground. He does not appear to be able to say how far this is due to the nature of the employment and how far to their bodily condition on coming to the mine (*quarry*). The men in the mills are usually brought up in the quarry villages, and begin to work at about the age of 14; many of the underground workers, on the other hand, are recruited from the farm labourers, who do not leave their healthy employment in the fields until they are 18 to 25 years old. Consequently the underground worker is in many instances better armed for the fight against disease than the surface worker. This fact alone may account for his living longer, in spite of his breathing an atmosphere often polluted by powder smoke. Further, it is suggested that the slate-maker suffers from dust produced by the various operations in the mill. The men believe that they unquestionably do suffer from it, but the doctors, in the absence of any direct proof by *post-mortem* examinations, are not prepared to admit as a certainty that consumption has been caused by the dust of the Festiniog mills. They all, however, consider that there is enough dust both above and below ground to be injurious to the health of the men; to what extent the injury may go, they are unable to say. Dr. Richard Jones, in one of his tables in the Appendix, shows that there is ample air space in the mills, viz., 5,019 cubic feet per man on an average, whereas 250 cubic feet are considered to be sufficient by the Inspectors of Factories under ordinary circumstances, and 400 cubic feet when the men work overtime.

Surface workers more liable to phthisis than underground workers.
R. Jones, 58, 59.

R. Jones, 18, 104.
R. Jones, 54, 59.
R. Roberts, 1052, 1075.
R. Jones, 160, 161.

R. Roberts, 1076.
R. D. Evans, 1668, 1714.

Influence of dust.
R. Jones, 148, 169.
R. Roberts, 1052, 1075, 1093, 1100, 1104, 1109.
R. D. Evans, 1648, 1653, 1679, 1714.

Air space in the mills.
R. Jones, 64.

Accidents. Diminution in the number of accidents.
R. Roberts, 1052.

42. Dr. Robert Roberts told us that the number of casualties has been materially reduced since the passing of the Mines Regulation Act, that the falling of men from one floor to another is now a thing of the past, and that the accidents from explosives are much less numerous than formerly.

Commonest accidents.
R. Jones, 87.
R. Roberts, 1052.
R. D. Evans, 1648.

43. We were informed that the most common accidents to the underground men are—

i. Sprains, bruises, contusions, &c.
ii. Head injuries, often produced by falls of rock from roof or pillars, or by blows from the crane handle.
iii. Fractures and dislocations.
iv. Injuries due to blasting.
v. Internal injuries.

R. Roberts, 1052.
R. D. Evans, 1648.

In the case of the slate-makers the accidents are usually few and slight, consisting of cuts and bruises; but occasionally a man may receive serious injury to the hand from the knife of the dressing machine.

Hospitals.
R. Jones, 132-7.

R. Jones, 138.

44. Only two quarries have hospitals, viz., the Oakeley and the Llechwedd. Men injured in other quarries have occasionally been taken to the Oakeley hospital, a fixed fee being paid for their maintenance. In the opinion of the doctors hospitals are most valuable institutions, and they regret that the men do not avail themselves more frequently of hospital accommodation. They agree that ambulance courses should be encouraged, but Dr. Roberts thought that the course of instruction of the St. John Ambulance Association might be simplified so as to suit the special wants of the quarrymen.

Ambulance classes.
R. Jones, 123, 129.
R. Roberts, 1052, 1083, 1085.
R. D. Evans, 1649, 1670-73.

Railway accommodation.

45. The three medical men were of opinion that the men who live at a distance suffer from want of better arrangements on the railways, both as regards carriages and station accommodation, especially on the Narrow Gauge or Festiniog Railway.

R. Jones, 91-6.
R. Roberts, 1052.
R. D. Evans, 1648.
R. D. Evans, 1648, 1679.

According to Dr. Evans there are 222 men travelling daily by the Narrow Gauge line in carriages which are much overcrowded, for each man has only about 15½ cubic feet of space; these carriages are ventilated by means of three windows of 19 inches square on each side, which open behind the nape of the neck of the passengers; consequently the workmen have either to sit in a draught and risk taking cold, or to breathe a very polluted atmosphere.

Evidence of quarry managers.
Thomas Evans, 374.
R. Roberts, 1741.
C. Warren Roberts, 3872.

46. Ten of the quarry proprietors and managers volunteered to give evidence. Their general feeling is that in future all quarry managers should be certificated in the same way as the managers of coal and ironstone mines. More than one of them complained of Special Rule 73, which requires wooden rammers to be used for pushing in or ramming down explosives and the first three layers of tamping. When the

frequency of accidents in tamping is borne in mind, it is evident that no necessary precautions should be relaxed. We were glad to learn from some of the witnesses that the men observe the special rules much better than they did formerly. R. Roberts, 1741. W. Owen, 2204. R. Roberts, 1741. O. R. Jones, 1339-50.

47. Complaints having been made by two witnesses that the drinking water was not pure, the owners of two of the largest mines had six samples analysed, and the results showed that all the samples were pure and could be safely used as a beverage. R. D. Evans, 1649, 1656, 1657. R. Roberts, 3513. C. Warren Roberts, 3589, 3590.

48. Mr. Robert Roberts pointed with satisfaction to the fact that no single accident, fatal or non-fatal, had happened from a fall of roof at the Oakeley mines during the last three years; but it must not be forgotten that four separate fatal accidents occurred there in that period from pieces of rock falling from the *sides* of chambers. R. Roberts, 1943. Appendix VII.

His contention that the manager of a slate mine should have equal privileges with the manager of a coal mine, and possess the right of asking witnesses questions at inquests, is only just and reasonable. (Section 48 (8), Coal Mines Regulation Act, 1887, 51 & 52 Vict. c. 58.) R. Roberts, 1741. C. Warren Roberts, 3590.

49. Mr. M. Kellow gave the Committee some details of his method of working the Park Quarry by the "filling-up" system, and claimed the following advantages for it:— M. Kellow, 2967. Filling-up method of working.

i. Larger blocks of slate.
ii. Greater output for a given expenditure of labour.
iii. Slate sent to the mill in a sounder condition.
iv. Collapse of the workings impossible.

Mr. Kellow was of opinion that a modified form of his system might be applied with advantage in the Festiniog quarries; but some of the Festiniog managers, on the other hand, thought it impracticable. M. Kellow, 2977. C. Warren Roberts, 3744-57.

50. Mr. C. Warren Roberts, of Llechwedd, who has already introduced many important improvements in the mine under his charge, gave valuable and interesting evidence. We learnt from him how power is being transmitted by electricity in his mine for the purpose of working pumps and ventilating fans, and supplying light along the inclines, as well as in the fitting shops, &c. above ground. The safety-brake, invented by him and Mr. Beckett, seems capable of preventing many of the accidents which happen with cranes. Up to the present time he has not perfected his ingenious appliances for sounding and examining the roof of a high underground chamber without the aid of ladders. Electricity employed for working pumps and ventilating fans and for lighting. C. Warren Roberts 3691, 3702, 3704. 3589, 3601-7.

Setting up fixed points, as suggested by him, to mark the line of the true meridian in the Festiniog district, would be useful to the surveyors, and would probably increase the accuracy of the plans. 3740-43.

51. Mr. N. F. Robarts agreed with the other managers concerning the advisability of providing technical instruction for foremen and those aspiring to become mine agents, and concerning the necessity of establishing examinations for certificates, as is done under the Coal Mines Act. Certificated managers desirable. N. F. Robarts, 4003.

52. Mr. Meyrick Roberts, manager of Bryneglwys Mine, Abergynolwyn, considers that the system of working five whole days in the week instead of five and a half has proved advantageous both to master and men. In this case the whole of the village belongs to the owner of the mine, and he lets out allotments to his workmen at a small rent; many of them can, therefore, find a healthy and profitable form of recreation on Saturdays. M. Roberts, 4261, 4273. Allotments. M. Roberts, 4261, 4320-4325.

53. When we take into consideration the large number of men who gave evidence, the list of complaints against the existing state of things was decidedly small. Several useful proposals were made. One set of suggestions, which had been carefully prepared by a committee of the workmen, was as follows:— Evidence of the workmen. O. R. Jones, 1296.

Prevention of Dangers Underground. 1. No work should be commenced in a new chamber until the inspectors of the company certify that it is safe to work in.

2. Periodical inspections should be made of every chamber in the mine, and a record of their condition kept in a book accessible at any time to the Government Inspector.

3. Water should be prevented from trickling down the working face.

4. Walls should be built up across disused levels to prevent stones being thrown by blasting from one chamber into those adjoining it.

5. Every crane should be provided with an efficient brake.

Government Inspection. 6. A sub-inspector having a practical knowledge of quarrying and speaking Welsh should be appointed.

7. The inspector should receive accounts of the accidents from the workmen themselves, without being dependent upon the agents as interpreters.

Sanitary Improvements. 8. Suitable eating-houses should be provided.

9. A proper supply of drinking-water should be available.

10. Proper privies or closets should be provided.

11. Some of the persons summoned upon coroners' juries to investigate mine accidents should have a knowledge of mining.

R. Davies, 1027. W. C. Williams, 1203. R. Griffiths, 1493–515. Hugh Griffith, 2335. D. Jones, 2643, 2644, 2648. R. Griffiths, 1596. D. G. Williams, 1967–71, 1979, 1980. Hywel Jones, 2473–75. John Jones, 3118. D. W. Jones, 3163.

54. Other suggestions made by individuals were the following:—

1. The mine owner should appoint a person to examine the sides of every chamber each time that an inclined slice (*thickness*, *tew*, W.) is worked off, and see that the sides are left safe.

2. It would be an advantage if a man had had some experience as a slate-maker before working underground.

3. No man who has not had some experience under the supervision of a practical rockman should have charge of a working place (*bargain*) or of blasting operations.

4. Pillars should not be cut away beyond a certain limit, except when a part of the mine is going to be abandoned.

O. R. Jones, 1398. R. Griffiths, 1592.

5. Revision of the Special Rules desirable.

The copious index of the evidence mentions various other matters brought forward by the workmen.

Cookery classes. E. H. Russell, 4133, 4134, 4159, 4161. A. Wilson, 4176. E. H. Russell, 4135–7.

55. From the teachers of cookery under the Festiniog School Board we learnt that all girls on entering the Fourth Standard, that is to say, when they are about nine or ten years of age, receive instruction in cookery, which is continued when they pass into the Higher Grade school. The course of instruction is short, for it occupies only 40 hours per annum, and is usually spread over five weeks, at the rate of eight hours per week.

E. H. Russell, 4132. A. Wilson, 4176–88. E. H. Russell, 4132. A. Wilson, 4176. E. H. Russell, 4168–70.

Last winter there were also evening classes in cookery in connexion with the Continuation Evening schools.

In the day classes the girls are taught how best to light a fire, clean knives and forks, and prepare various kinds of dishes at the lowest possible cost, while the work in the evening classes is of a more advanced character.

W. A. Ellis, 4752.

Valuable instruction in cookery has likewise been given under the auspices of the Merionethshire County Council in the quarry districts. Miss Ellis informed us that on the whole her lectures were well attended and that genuine interest was taken in them. She insisted upon the desirability of making cookery a compulsory subject for girls in Elementary and Intermediate Schools, and said that far greater store should be set upon careful and continuous teaching of domestic economy than is done at present.

Reasons for insanitary condition of some of the houses. H. P. Maybury, 4198.

56. Mr. Maybury assured us that the local authorities were fully alive to many of the defects mentioned by the medical men. He said that there are 2,110 houses in the Festiniog Local Board District, of a rateable value of 9*l.* a year and under, occupied almost entirely by quarrymen, and that about 25 per cent. of them are inhabited by the owners themselves. Various reasons were adduced by him to account for the damp and unsatisfactory condition of many of the houses:—

i. Close proximity to rocky cliffs, rising up precipitously behind them.

ii. Arrangement in terraces, so that sometimes one row of houses is affected by percolation from its own back premises, or from the row above.

iii. Standing upon water-logged peat.

iv. Absence of proper damp-proof courses.

v. Absence of gutters at the eaves of the roofs.

Barracks. H. P. Maybury, 4198–4207.

There are 348 men living in barracks in the district; these barracks have lately been treated as common lodging-houses, save that two persons are allowed to sleep in a bed at the same time. The barracks are now inspected periodically.

CHAPTER VII.

VISIT OF THE COMMITTEE TO THE CONTINENT.

Quarrying marble in Belgium.

57. The main object of this visit was to see a method of quarrying marble in Belgium, with a view to ascertain whether some modification of it could be employed in the Festiniog slate mines.

The Traigneaux Marble Quarry lies some three miles from Philippeville, a town about 50 miles south of Brussels, and not very far from the French frontier. It is

worked by a company known as the "Société Anonyme des Carrières et Usines à "Marbres de l'Entre Sambre-et-Meuse." The three members of the Committee who went to the Continent were very kindly received by M. Berlo, the managing director of the company, who took them to the quarry and gave them every information in his power. The method of working practised at the Traigneaux Quarry may be briefly described as making vertical cuts in the marble by an endless wire saw. The blocks are then severed horizontally by wedging.

Endless wire saw.

The endless saw consists of a strand made up of three iron or soft steel wires of $\frac{1}{4}$-inch in diameter; this is made to travel by machinery along the stone to be cut, whilst sand and water are fed on continuously. The sharp grains of sand are carried along in the interstices between the wires, and gradually cut out a groove rather wider than the diameter of the strand. The wire is kept against the bottom, as the groove is deepened, by means of suitable pulleys fixed in vertical pits about 3 ft. 6 ins. in diameter, which have been excavated by hand or by machinery.

The process, brought out originally by M. Wilmart of Brussels, has been in use at the Traigneaux Quarry for upwards of ten years, and is considered highly satisfactory. It is employed, not only for cutting out large blocks from the parent bed, but also for subdividing them in the quarry and at the marble works.

We are of opinion that the wire saw might possibly be used in Festiniog for cutting down the sides of the chambers mechanically, and so leaving the pillars in a safer condition.

We desire to express our feelings of deep obligation to M. Berlo for the pains he took to render our visit profitable and agreeable.

Underground slate quarries at Fumay.

58. After leaving Philippeville, we spent two days in France, visiting under-ground slate quarries at Fumay, to the north of Mézières-Charleville, and at Rimogne, to the west.

Thanks to the arrangements which had been made for us by M. Brassart, the managing director of the "Société Anonyme de l'Ardoisière du Moulin Ste. Anne," our visit to the principal under-ground slate quarry at Fumay was rendered interesting and instructive. The bed of slate resembles to some extent the Festiniog deposits, but it is only about 23 feet thick. The system of working is totally different from that usually employed in North Wales. The bed is removed, slice after slice, by working from below upwards, and the supporting pillars are arranged along the strike. The rubbish is piled up in the chambers, and the men stand upon it while at work; they are thus always within reach of the roof, in fact, their work consists in taking off slice after slice from the roof.

Underground slate quarries at Rimogne.

59. At Rimogne, we were fortunate enough to be conducted through the underground workings of the St. Quentin pit by M. Lemmens, the managing director of the "Ardoisières réunies de Rimogne." The bed which is being worked is from 25 to 50 ft. thick, and dips at an angle of 42°. The system of working bears some resemblance to that employed at Fumay, that is to say, the pillars are formed along the strike and the bed is worked off in slices from beneath upwards, beginning at the lowest layers, whilst the workmen stand upon the rubbish and have all overhanging rock within easy reach. M. Lemmens informed us that accidents from explosives had become almost unknown since they had adopted cartridges of compressed gunpowder in place of the ordinary loose gunpowder formerly in use.

Though not suggesting that this mode of working is applicable to the Festiniog district, it yet possesses the following advantages:—

(1.) Smaller amount of waste material conveyed to the surface.
(2.) General collapse of the workings rendered impossible, owing to the chambers being filled up with rubbish.
(3.) Roof of the chamber always within reach, rendering careful examination very easy.

Our warmest thanks are due to M. Brassart and to M. Lemmens, for having afforded us the means of obtaining a practical insight into their methods of working.

Merionethshire managers should visit other mining districts.

60. Now that travelling is so easy and inexpensive, we think that the Merionethshire Slate Mining companies might, with advantage, occasionally send their managers and under-managers to other districts at home and abroad, for the purpose of learning through the eye the improvements which are constantly being made in the art of mining.

CHAPTER VIII.

Recommendations.

Recommendations.

61. We have classified our recommendations under the following headings:—

I. Prevention of accidents.
II. Care of injured persons.
III. Promotion of health.
IV. General matters.

I. Prevention of Accidents.

Prevention of accidents.

62. We have already pointed out what kinds of accidents most frequently happen at the slate mines, and it now remains for us to suggest some methods of lessening their number. The four categories which are most fatal, are:—

1. Falls of ground.
2. Explosions of gunpowder and other explosives.
3. On inclined planes.
4. By machinery underground.

1. *Falls of Ground.*

Periodical inspections.

63. As long as the present method of working by huge open chambers is pursued, there will be occasional unexpected falls from the roof or from the sides. Something may be done to render the falls less frequent by the careful inspection of each chamber, at intervals of not more than six months. This work might be facilitated by using some powerful illuminant, such as an electric search light, and telescopic ladders specially constructed for the purpose. The sides of the pillars should be inspected after the removal of each slice (*tew*, W.) by a competent quarry official, who should see that they were left secure. The results of the inspections should be recorded in a book kept for the purpose at the office of the mine.

Falls during the actual process of excavating blocks cannot be entirely prevented, but slate-getters can do much to protect themselves by a careful examination of the working places, as is now required by one of the Special Rules.

Supporting barriers.

64. Where the workings are carried on to a considerable depth, the present pillars along the dip do not seem to us to offer sufficient guarantee of safety; in cases of this kind we think that it will be advisable to leave adequate barriers along the strike of the beds from time to time, and so enhance the general stability of the workings and prevent the liability to collapse.

Robbing pillars.

65. The "robbing" of pillars should be forbidden as long as any workings likely to be injuriously affected thereby are in operation.

Sides of chambers to be cut mechanically.

66. We are of opinion that the working of slate by the system of large chambers would be rendered safer by cutting down the sides mechanically, instead of wrenching off the rock by blasting. It is not for us to specify what particular, "channelling machine" should be used for the purpose; but we believe that appliances which are already in the market could be arranged so as to do the required work. Other groove-cutters are sure to be invented. If a system of mechanical cutting were adopted, the pillars might be laid out along the line of dip and formed with vertical sides, instead of being somewhat askew and leaning, as they often are now. They would thus afford

Advantages.

better support to the workings than they can in their present shape. Mechanical cutting would lessen the amount of blasting, with its numerous accidents and troublesome powder smoke, and diminish the vibrations of the supporting pillars which necessarily in time tend to bring about falls. In addition to the increased safety, there would probably be other advantages, such as increased output, diminution of the enormous waste of valuable material, and a saving in cost.

67. When mechanical groove-cutters have become recognised appliances in the Merionethshire slate mines, it may be found possible to modify the system of working considerably, with the result of having fewer unexpected falls of blocks or parts of blocks during the process of slate-getting. Any such modifications will have to be carried out under the light of the experience gained with these machines, which as yet have not been introduced into North Wales.

2. *Explosions of Gunpowder, &c.*

Iron and steel rams.

68. Some of the accidents with explosives can be avoided by prohibiting the use of iron and steel tools in the processes of charging and tamping. Loose gunpowder has

been the cause of many casualties: we lean to the opinion that wherever it is practicable the use of naked powder should be discontinued. mers to be discarded.

The practice of firing holes with two different explosives, such as gunpowder and gun-cotton, at the same time has likewise led to accidents, and we think that explosives should in no case be used save in the manner recommended by the makers. Mixing explosives undesirable.

Walls should be built across disused tunnels in the pillars, so as to prevent blasting in one chamber from throwing stones into the next.

3. *On Inclined Planes.*

69. Riding upon waggons should be prohibited, and as far as possible separate pathways should be provided for descending into and ascending from the workings, which are nowhere deep enough to make mechanical raising and lowering a necessity. Working inclines should not be used as travelling roads, except in the case of the lowest floor of all, before there has been time to establish a second path. Better illumination of places where there is much traffic would be a step in the direction of increased safety. Special pathways for descent and ascent.

4. *By Machinery Underground.*

70. Many of the accidents with cranes would be avoided if they had brakes; we recommend that every crane should be provided with an efficient brake. Cranes to have brakes.

71. The inexpediency of having more than one set of Special Rules in a small district with almost identical conditions in all the mines is self-evident. At the present time the men have a right to do things in one mine which are forbidden in the next; this state of things must lead to a difficulty in enforcing the rules, and we strongly urge the adoption of one code of rules for Merionethshire, or at all events for the Festiniog district. If a uniform code is established, the opportunity of the change might be utilised to revise some of the rules and to insert new ones to meet our recommendations. We would suggest that any such new code of rules should be drawn up by a committee of employers and employed in conjunction with Her Majesty's Inspector of Mines. Special Rules should be uniform.

II. Care of Injured Persons.

72. Our own personal experience, and the evidence of the medical men, fully warrant us in advising that the best methods of rendering "first aid" to injured persons should be taught to every man and boy employed in mines. We consider that the owners and agents of mines should give an impulse to such teaching by affording facilities for instruction in ambulance work, by taking a personal interest in the classes, by offering prizes, and by establishing ambulance corps, such as already exist in connexion with some collieries. We need hardly add that we should like to see the 34th General Rule of the Coal Mines Regulation Act incorporated with any new Act for regulating the working of slate mines. This rule compels the owner to provide stretchers, splints, and bandages, ready for immediate use. We would even go further than this and not allow any person to be a manager until he had taken the certificate of the St. John Ambulance Society, or some other society of like nature and equal standing. The certificate is so easily obtained that an owner would not be inflicting a hardship upon the working population if he required at least one-fourth of his employés to pass the necessary examination. Ambulance classes. Appliances for rendering first aid to the injured.

The old method of conveying injured men from the Festiniog mines in unwieldy litters should be abandoned, and convenient light stretchers should be provided in their place.

73. The thorough recovery of injured workmen is often retarded or endangered by treatment at home, where, with the very best intentions on the part of relatives, there may be a lack of proper diet and conveniences, and utter ignorance of nursing. We fully recognise the good which has been done at Festiniog by hospitals, and we endorse the desire of the medical men that hospital accommodation should be provided for the workmen of all the mines. Hospitals.

74. Even if more hospitals are established and if the prejudice which exists against them in the minds of some persons is overcome, some cases will always be attended Nursing.

to at home; we may, therefore, fairly insist upon the advisability of teaching every girl the rudiments of the art of nursing. The knowledge is sure to be of service to every woman at some time of her life, if not for accidents, at all events for disease. The movement might be stimulated by establishing in a centre like Festiniog a properly uniformed nursing corps of women, ready to render their services in case of need.

III. Promotion of Health.

Promotion of health.

75. After the evidence given by the medical men, we can have no difficulty in making suggestions for the improvement of the health of the Festiniog workmen. They may be arranged under the various headings:—

1. Houses.
2. Food.
3. Clothing and habits. (Public baths.)
4. Travelling to and from work.
5. Accommodation at the mines.
6. Sanitary arrangements.

1. *Houses.*

Insanitary dwellings to be condemned by local authorities.

76. The three great requisites for wholesome dwellings are that they should be dry, light, and clean; and in a rainy climate, like that of the mining (*quarry*) districts, it is necessary to insist very strongly upon excellence of construction, and upon the observance of all precautions calculated to prevent damp walls and damp floors.

We consider that the local authorities in the quarry districts should see that their towns and villages are properly drained, and should fearlessly condemn all dwellings which do not present the necessary guarantees of dryness and perfect sanitation. That such a course will cost money we readily admit; but, in our opinion, any expenditure for promoting the general health of the community will be amply repaid by the lessening of disease. To quote the trite proverb, "Prevention is better than cure."

2. *Food.*

Instruction in cookery to be extended.

77. The evidence of the medical men shows that the food of the quarrymen and its mode of preparation might be greatly improved, and their opinion is corroborated by the instructresses in cookery. We fully recognise the impossibility of suddenly altering the mode of living of the workmen and their families; any change must be begun with the young, and it may be accomplished gradually by laying more stress upon the teaching of cookery in schools. We consider the present course too short; but if the maximum grant for the subject can be earned in five weeks, the school authorities have no inducement to prolong the teaching. Cookery cannot take the place which it deserves in the school curriculum until the Education Department becomes impressed with the fact that it is an art of paramount importance to the working classes.

3. *Clothing and Habits.*

78. The evidence of the doctors was to the effect that the workmen are suitably clothed, but that they do not change their underclothing or perform their ablutions as frequently as is desirable. The blame for the want of cleanliness with which the quarryman is reproached, is partly attributable to faulty barracks, without appliances for washing or living in decency and comfort. The Inspectors of Mines have directed attention to the shortcomings of the barracks upon more than one occasion in their reports. The Festiniog Local Authorities have at last awakened to a sense of their responsibilities, and, as far as the barracks are concerned, no doubt matters will be improved, though we do not agree with them in allowing two men to occupy one bed.

Public baths a necessity.

For the people generally, it is necessary to go further than the rules and regulations which can be enforced by byelaws. They must be taught from their earliest childhood that the body must be respected, that baths are essential, and frequent changes of underclothing a *sine quâ non* if health is to be preserved. Let the local authorities establish public baths and let the rudiments of hygiene be taught to every boy and girl. It is useless to hope for improved hygienic conditions among the workmen until the schools, local authorities, and persons in position act as guides, and point out the paths which lead to health.

Instruction in hygiene.

4. *Travelling to and from Work.*

79. We are of opinion that some of the illnesses of the Festiniog men may be fairly attributed to chills contracted in the daily railway journeys to and from the mines (*quarries*). The men waiting for their train, sometimes in wet clothes, may often be seen sitting on the ground at one of the stations of the Narrow Gauge railway, as there is not sufficient bench accommodation. A journey of three-quarters of an hour in damp clothes in a draughty railway carriage may easily lay the foundations of disease, and quarrymen who can live within easy walking distance of their homes would, *a priori*, be expected to be less subject to illness than those who travel daily to and from their work by rail. On the other hand, one of the witnesses told us that, in his opinion. lower house rent at Penrhyn and a better climate more than made up for the possible risk of catching a chill when travelling. The medical men do not agree with him on this point. Better railway accommodation.

The stations and the carriage accommodation of the Narrow Gauge railway might doubtless be improved, and some effort might be made by the railway companies to run more convenient workmen's trains.

5. *Accommodation at the Mines.*

80. At many ore mines the men have a set of clothes appropriated solely for their work, which they don on arriving at the mine in the morning, and take off again in the evening, so as to go home in their ordinary dress. A suitable changing-house is provided by the mine owner, with a fire or heating apparatus of some kind for drying the clothes. The miner, therefore, always has a dry suit in which to commence work, and no matter how wet he gets during the day, he can put on warm, dry, and clean clothes before starting for home. It is true that slate mines are drier than the average lead or tin mine, so that the workmen as a rule do not get wet; but many of them are often exposed to heavy rain in proceeding to their work, and we think that the example of the Cornish miner might be followed with advantage. But, given the best and most comfortably arranged changing-houses, would the Merionethshire men use them? We must confess that we do not believe they would, and on this ground we do not feel justified in recommending that they should be erected everywhere. We should like to see the experiment tried of providing one of the mines with a thoroughly good and comfortable changing-house, with every convenience for washing and dressing; if it were found that the younger men gradually began to avail themselves of the health-giving appliances, we would advise Section 23 (16) of the Metalliferous Mines Act, relating to changing-houses to be enforced rigidly. Dressing-rooms.

Comfort during meals is essential. Excellent eating-houses may be seen at some mines (*quarries*), and we should like to see them universal. Dining-rooms.

6. *Sanitary Arrangements.*

81. Much was said in evidence about the absence of closet accommodation above and below ground. We are by no means convinced that any illness has ever resulted from this fact; but the present practice may lead to disease, and we recommend that sufficient closet accommodation be provided below and above ground, and that the men be forbidden to use the old workings as latrines. The amount of closet accommodation required below ground would be small. Closet accommodation.

As far as it is reasonably practicable, under-ground paths along which men go to their work should be kept dry, and water should be prevented from running down the working faces. Under-ground paths and working faces to be kept dry.

Considering the large amount of cubic space per man in the slate mills, and the comparatively small amount of dust which is produced, we think that watering with a hose or spray in very dry weather will probably render the atmosphere sufficiently harmless. Every quarryman may, to a great extent, protect himself from the noxious influence of dust by breathing through the nose instead of through the mouth. Men in the mills should be guarded against unnecessary draughts as far as possible. Dust to be kept down by watering.

IV. General Matters.

82. It appears to us high time that the Metalliferous Mines Regulation Act should be amended. It must be regarded as a tentative Act; it has already been in force more than twenty-one years, and it has been found in practice to contain various Amendment of Metalliferous Mines Regulation Act.

defects. We have pointed out that the average slate mine is more dangerous than the average colliery. If certificated managers are required for the latter, *à fortiori* they become necessary for the former. In fact any privileges belonging to the collier should be conferred upon the slate-getter. Thus, he should have the power of being represented at inquests, and of making a monthly examination of the workings. (Coal Mines Regulation Act, 1887, Section 49. Rule 38.)

The 21st General Rule of the Coal Mines Act, which compels the securing of the roofs and sides of the travelling roads and working places, should likewise be made applicable to slate mines.

Any new Act should compel a daily visit to every working place by a competent person, and the keeping of a record of any defects or dangers.

Interested magistrates are forbidden to adjudicate upon cases under the Coal Mines Act, we fail to see any reason why they should be considered sufficiently impartial for dealing with cases under the Metalliferous Act.

The inhabitants of the Principality may fairly claim that, other things being equal, candidates speaking the Welsh tongue should have a preference in the appointments as inspectors.

It is desirable that some of the persons summoned to serve upon coroners' juries for investigating mine accidents should have a knowledge of mining. In mining districts this suggestion may easily be carried out. If there is a difficulty in getting such persons during the daytime, the inquests might be held after working hours.

Definition of non-fatal accidents.

The present definition of the kind of non-fatal accident which has to be reported gives trouble.

The manager of a mine is often in doubt as to what constitutes a serious personal injury within the meaning of the Statute. In many cases it is difficult for a doctor, and impossible for a layman, to decide upon the spot what the consequences of an accident are likely to be. The result is that some casualties which at first sight appear to be slight, are apt to remain unreported even after time has proved that the injury was serious. We consider that the statistics relating to non-fatal accidents would be rendered more reliable by compelling the managers to report immediately—

i. Any accident causing personal injury which arises from an explosion of gas, any explosive, or any steam-boiler.

ii. Any accident causing the fracture of a bone of any person employed.

And to report within eight days after its occurrence,

iii. Any accident which has caused an absence from work of more than seven consecutive days.

Technical instruction.

83. It is useless to advocate a higher standard of attainments among mine agents and foremen without giving them the means of improving their technical education. We therefore advise the establishment in Merionethshire of classes for instruction in mining and quarrying, and in the sciences bearing upon these industries. Much useful work of this kind is being done in other parts of the kingdom under the auspices of the respective county councils, and similar work might be done in Merionethshire; we also suggest that the University Colleges of Wales should extend to the mineral industries the aid which they are ready to give to agriculture.

Further, there is no reason why the time-honoured "Eisteddfodau" should not direct their attention, now centered almost solely upon literature and music, to hygiene, mining and quarrying. Until the people as a whole are convinced, by precept and by practice, that they can escape many of the ills of the flesh by observing known sanitary rules, we fear that little improvement in the health of the quarrymen can be expected. The well-qualified medical officers of health for the county are quite able to advise what measures should be undertaken, it remains for the ratepayers to support them in their endeavours to promote the welfare of the community.

Government inspection.

84. As regards Government inspection, one wish of the workmen has been anticipated. Two Welsh-speaking Assistant Inspectors of Mines have already been appointed to the North Wales district.

Summary of recommendations.

85. We append a summary of our recommendations. From this it will be seen that though some aid from Parliament is invoked, much good may be effected by making better use of existing laws and institutions. It must be remembered, however, as pointed out by Mr. C. Warren Roberts and Mr. Morris Thomas, C.C., that the burden of responsibility is divided between the masters and the men. Both have a duty to perform—the former in adopting all possible precautions, the latter in obeying rules and in using such ordinary care as common sense and experience may dictate.

Summary of Recommendations.

Description.	Page.	Paragraph.
I. Prevention of Accidents.		
1. Daily visits to each working place, and daily record of defects and dangers	xxx	82
2. Minute inspection of the roof and sides of each working chamber, at intervals not exceeding six months, with the aid of some powerful illuminant, such as the electric light	xxvi	63
3. Occasional barriers to be left along the strike of the beds when the workings become deep	xxvi	64
4. Adoption of mechanical groove-cutters for cutting down the sides of the chambers	xxvi	66
5. Iron and steel tools to be prohibited in charging and tamping	xxvi	68
6. Naked gunpowder to be used as little as possible	xxvi	68
7. Two different explosives not to be used in the same hole	xxvii	68
8. Walls to be built across disused tunnels in the pillars	xxvii	68
9. Riding upon waggons ascending or descending inclines to be forbidden	xxvii	69
10. Special pathways to be provided, as far as possible, so as to render walking upon inclines used for traffic unnecessary	xxvii	69
11. Cranes to be provided with efficient brakes	xxvii	70
12. Special Rules to be made uniform throughout the Festiniog district, or better throughout Merionethshire	xvii	71
II. Care of Injured Persons.		
13. Ambulance classes to be established in every mining district and to be encouraged by the mine owners	xxvii	72
14. Stretchers, splints, and bandages to be provided	xxvii	72
15. Managers of mines to be compelled to take the certificate of the St. John Ambulance Association	xxvii	72
16. More hospital accommodation to be provided	xxvii	73
17. Every girl to be taught nursing	xxviii	74
III. Promotion of Health.		
18. Houses to be made light and dry, and to be kept clean	xxviii	76
19. Quarry towns and villages to be drained	xxviii	76
20. Barracks to be improved and rendered fit habitations for workmen	xxviii	78
21. Practice of two men sleeping in the same bed to be prohibited	xxviii	78
22. Cookery to take a more important part in the school curriculum	xxviii	77
23. People to be taught and encouraged to keep themselves clean	xxviii	78
24. Public baths to be established	xxviii	78
25. Accommodation for workmen travelling by the Festiniog Railway to be improved	xxix	79
26. Hours of the workmen's trains to be made more convenient	xxix	79
27. Experiment of giving accommodation for washing and changing clothes at the slate mines to be tried, and to be extended if found successful	xxix	80
28. Dining-rooms to be provided	xxix	80
29. Sufficient closet or privy accommodation to be provided below and above ground	xxix	81
30. Underground footpaths and working faces to be kept reasonably dry	xxix	81
31. Appliances for laying the dust in mills to be provided	xxix	81

Description.	Page.	Paragraph.
IV. GENERAL MATTERS.		
32. Metalliferous Mines Act to be amended. Managers to be certificated	xxx	82
33. Workmen to have the power of making monthly inspections	xxx	82
34. Managers and representatives of the workmen to have a right to watch inquests	xxiii and xxx	48, 82
35. General Rule of Coal Mines Act concerning security of working places to be made applicable to slate mines	xxx	82
36. Magistrates interested in mines not to adjudicate	xxx	82
37. Welsh-speaking inspectors to have the preference, other things being equal	xxx	82
38. Coroners' juries to be composed in part of persons having an acquaintance with mining	xxx	82
39. Definition of non-fatal accidents, which have to be reported, to be improved	xxx	82
40. Classes to be established under the Technical Education Act or by the Merionethshire County Council to teach mining, quarrying, and subjects bearing upon these industries	xxx	83
41. Technical and scientific instruction to be given in connexion with the University Colleges of Wales	xxx	83
42. Hygiene and technical knowledge to be encouraged by the "Eisteddfodau"	xxx	83
43. Managers to visit other mining districts	xxv	60

Of these recommendations, Nos. 14, 15, 32, 33, 34, 35, 36, 37, and 39 would have to be carried out by an amendment of the Metalliferous Mines Act.

Many of the others, such as 1, 2, 3, 5, 6, 7, 8, 9, 10, and 11 might be enforced by Special Rules; indeed the Special Rules at certain mines already include some of them.

The local authorities have power to deal with the recommendations relating to dwelling-houses and barracks.

In conclusion we desire to express our obligations to the witnesses who came forward with useful suggestions, and to Mr. Treglown of the Ingersoll-Sergeant Company, who visited the Festiniog quarries at our request and furnished us with a report. We feel especially indebted to the medical men of Blaenau Festiniog, who took the greatest pains to furnish sound information and trustworthy statistics, and to the managers of mines who supplied drawings and photographs, besides giving us the benefit of their experience.

86. Mr. G. J. Williams, who since the commencement of the inquiry has been appointed an Assistant Inspector of Mines, rendered good service as interpreter.

We have the honour to be,

Sir,

Your obedient Servants,

C. LE NEVE FOSTER,
Chairman and Secretary.
JOHN E. GREAVES.
JOHN J. EVANS.
E. PARRY JONES.
JOHN JENKINS.

APPENDIX I.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

COMMITTEE

APPOINTED TO INQUIRE INTO THE

DANGERS TO HEALTH, LIFE, AND LIMB OF THE WORKMEN EMPLOYED IN THE MERIONETHSHIRE SLATE MINES.

FIRST DAY.

At the Cocoa Rooms, Blaenau Festiniog, 5th December 1893.

PRESENT:

DR. C. LE NEVE FOSTER in the Chair.

MR. J. E. GREAVES, J.P.	MR. J. J. EVANS, F.G.S.
MR. E. PARRY JONES, J.P.	MR. JOHN JENKINS.

DR. RICHARD JONES, Blaenau Festiniog, examined by the Chairman.

Dr. R. Jones.

5 Dec. 1893.

1. I believe you are a doctor of medicine of the University of Edinburgh?—Yes, I am.

2. And that you have taken the Public Health Degree at Cambridge?—I have.

3. What is the exact title of that degree?—D.P.H. Camb.

4. How long have you been in practice in this district?—For 14 years.

5. Your practice, I believe, has largely been among the persons who are engaged in quarrying?—Yes, entirely so, and those dependent upon them.

6. Will you give us the result of your investigations into the health of the workmen as affected by his occupation, or by his residence?—I may say at the outset, that I was struck some time ago by an answer given before the Labour Commission by one of the witnesses. I forget the exact number of the question to which the answer was given, but I believe it is 7160 odd. The witness stated that the quarryman died young, and that the mean age at death was 30. In the month of January last, I went and examined the registers of death in the whole of this registration district, and I compiled a table of statistics, showing the mean age at death of the quarrymen who were employed at the Festiniog Slate Quarries. These tables include not only the quarrymen actually at work at the different quarries in this district, but those who had formerly worked there, but had left the quarries, as they were described in the registers. For the purposes of these tables I have divided the quarrymen into four classes, as follows: quarriers, rockmen, and miners, and labourers, and in the fourth class I have put the engine-drivers, platelayers, weighers, and men of that character who work at odds and ends in the quarry. I find from *Table I., that during the 10 years extending from 1883 to 1892 the mean age at death of those who have died, and have been registered as quarriers, was 47·9 years. That is the mean average of 10 years.

7. Before you go any further, may I ask exactly what you include under the term "quarriers"?—I was going to refer to that. I include exactly all those who were registered as quarriers, but in this mode of registration there are palpable mistakes. I will only point out one of them just to show what I mean. In the year 1888, there was an accident in the Oakeley Quarries, and five men were killed. Four of these men were in this registration district, and they have been registered as quarriers, whereas in reality they were labourers and not quarriers. The statistics are therefore faulty, inasmuch as the actual occupation of the man at the time of his death is not registered, and I would suggest that an improvement should be made in this respect.

8 Do you, under the term "quarrier," refer simply to men who are employed above ground?—Yes, so far as the registers are correct, men employed above ground.

9. (*Mr. E. P. Jones.*) Does it include all those?—Yes, but mostly splitters and dressers, so far as the register is correct. I find that the mean age at death of those who are classified as rockmen and miners was 48·1 years; those as labourers 54·3; and those in the fourth class (engine-drivers, platelayers, &c.), 60·3,—the mean age of the four classes being 52·6.

10. (*Chairman.*) Would the term "labourers" include any persons who work above ground, or not?—Yes, it would, such as those cleaning the mills and so on.

11. (*Mr. Jenkins.*) Do the miners include rockmen?—Yes. I classify the miners and rockmen together.

* Vide Appendix II, p. 136.

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12. (*Mr. Jones.*) So that really your quarriers are slate-makers?—Yes, clearly, except for the mistakes that have been made in the registers. All the tables I have just referred to include accidents, and the mean age at death for the 10 years works out, as I have stated, to 52·6.

13. (*Chairman.*) And the witness at the Labour Commission gave 30 as the age?—Yes.

14. (*Mr. Evans.*) Does that include all classes?—Yes, in the Festiniog district. I have no figures as to any other district, but here it is 52·6. That is the mean age at death for the last 10 years, from accident and disease.

15. (*Mr. Jenkins.*) Those figures include accidents as well as deaths from disease?—Yes. If we exclude accidents, the mean age is 54 years, as is shown in Table II., which I propose to put in. All these tables relate to the 10 years between 1883 and 1892. The mean age at death of those who have died from accidents during those 10 years is 39·4, as is shown by Table III.

16. (*Mr. Jones.*) In the 52·6 where do you begin—at what age?—At 14 years of age. There is a footnote to the tables I am putting in which explains that. I state there that boys enter the quarries at the average age of 14 years. While referring to these tables I should like to point out some conditions that may modify this apparent disparity between the age at death of the different classes of workmen. In the first place, the registration is not correct, because men whom I knew to be labourers are entered as quarriers. In the second place, all those who work in the mills or outside go to the quarry at the average age of 14, whereas those who go under-ground to work go there, as far as my experience goes, between the age of 18 and 20 years, that is to say, they do not go to work under-ground at the same early age as they do above-ground. In arriving at the mean age at death of those two classes that is an important point to consider, because you have a larger proportion of young people among the quarriers than you have amongst rockmen and miners, and so the mean age would naturally be lowered.

17. (*Chairman.*) What do you think the rockmen and miners work at before they go to work to the quarries?—The rule in Festiniog, I believe, is that they work as agricultural labourers in many places outside the district. The majority of them come here and go to work as labourers in the quarry. They are then drafted to be rockmen, and perhaps miners. They commence as such when they are 18 and 20 years of age, and not at the early age that the quarryman proper commences to work at.

18. (*Mr. Evans.*) Do you think those men are stronger physically at their age than the men who work at the quarry?—Yes, I believe so. I believe that the supply of men to form the rockmen and miners and labourers is drawn from a different class of people to that which supplies the quarrymen who work outside in the mills, because almost all the quarrymen that work in the mills live in Blaenau Festiniog and Llan, or at all events the great majority of them. I have no figures to prove it, but that is my impression. They have been born and bred here in most instances, whereas those who work inside come from the agricultural districts round about, and learn to work as rockmen and miners after they have attained the age of 18 and 20 years.

19. (*Chairman.*) They start with a better supply of health, as it were, than the quarriers?—Yes, quite so.

20. (*Mr. Greaves.*) Then do you consider the population of Festiniog to be not so strong physically as the population of the outlying districts?—I do not exactly say that, but there are circumstances always attached to mining districts which must be taken into consideration as well, such as marriage, inter-marriage, infectious diseases (taking consumption as one), which tend to make the population not so strong perhaps in some respects as that of an agricultural labourer.

21. I suppose climatic conditions affect the question as well?—Yes, the height above the sea is an important consideration. We are here about 700 feet above the level of the sea, and all that must be taken into account in considering the question.* Thinking that the question might possibly be asked as to the mean age at death of those in this district who are not employed in quarrying, I have prepared another table.† This covers the same period, the 10 years between 1883 and 1892, and shows the mean age at death of the male inhabitants over 14 years of age, other than those employed in the slate quarries, in the same registration district. I have divided this portion of the population into four classes. In the first I put farmers; in the second merchants, grocers, drapers, tailors, weavers, gentlemen, professional men, clerks, accountants, insurance agents, travellers, &c.; in the third masons, joiners, shoemakers, bakers, slaters, butchers, saddlers, plasterers, blacksmiths, sett-makers, nailers, carriers, stonecutters, &c., and in the fourth I put agricultural and general labourers.

22. (*Mr. Jones.*) What is the age that you begin at in that table?—I begin at 14 years of age, as in the other tables. I include all the male inhabitants of 14 years of age and upwards, and I find that the mean age at death of all those classes put together is 59·46 years. Here again we must take into consideration the fact that we have a larger proportion—as I believe, though I have no figures to prove it—of aged people amongst those who are outside the quarries than amongst those who work in the quarries. How far that is correct I do not know, as I have no figures to guide me; but my impression is that that is the case, and it is a matter for consideration in comparing the various tables. We have also a lower birth-rate amongst those not employed in the slate quarries than amongst those employed there.

23. That would be so, naturally, if the ages are different?—I do not say they are. I mean the proportion of aged people between 40 and 75 years of age; but, apart from that, I believe the birth-rate amongst the quarry population to be higher than it is amongst those who are not quarrymen, and, of course, this makes the mean age at death lower, because you have a larger proportion of young people amongst the quarrymen.

24. (*Mr. Greaves.*) You include the tradesmen in one class?—Yes. The tradesmen are all in one class, the mechanics in another, and the labourers in another.

25. (*Chairman.*) The mean age at death of the whole of the male population, excluding those employed in the slate quarries, above 14 years of age, is 59·46?—Yes.

26. And of those employed at the quarries the figure is 52·6?—Yes, including accidents, and 54 excluding accidents.

27. But including accidents it is 52·6?—Yes.

28. And therefore there is an advantage on the part of the non-worker at the quarries of nearly seven years of life?—Yes, quite so, according to these figures. They prove that distinctly; but as I have pointed out there are considerations that ought to weigh in comparing the two, and these are the birth-rate and the larger proportion of aged people in the one class as compared with the other.

29. (*Mr. Jenkins.*) Have you any proof of that?—No I have not.

30. I mean as to the birth-rate?—No, I have not.

31. Or of the greater proportion of old people?—No, I have no figures as to that either.

32. (*Mr. Jones.*) You say the quarries receive the supply of workmen from outside?—Yes.

33. The young people come to work to the quarry?—Yes.

34. And the old people stay outside?—Yes. That is the way I look at it.

35. (*Chairman.*) Comparing the men who work at these slate quarries with the merchants, grocers, drapers, tailors, and so on, there is only an advantage of one year in favour of those classes?—Yes. In their case it is 53·57 years.

36. Against 52·6 in the case of the quarryman?—Yes.

37. The tradesman has just the advantage of one year of life?—Yes.

38. The person who works at the slate quarries is only minus one year, so to speak?—Yes, compared with Class 2 Table VII.

39. And Class 2 comprises merchants and tradesmen of different kinds?—Yes.

40. (*Mr. Evans.*) Excluding deaths from accidents they are not up to the average of quarrymen, according

* The altitude of the quarries at Festiniog varies from 800 ft. to 1,500 feet.
† Vide Table VII., Appendix II., p. 137.

to those figures?—No, by about one year, if you exclude accidents.

41. (*Chairman.*) Then if it were not for accidents the men employed at the slate quarries would live longer than the average tradesman?—These figures go to prove that; but I cannot say exactly. According to these statistics that would appear to be the case. I have also entered into the question of the number of deaths from phthisis (consumption) amongst those employed in the slate quarries, and I have prepared figures on that head for the same period, Table VIII. I find that the total number of deaths from all causes, amongst those employed in slate quarries for the 10 years from 1883 to 1892, was 473; and out of that number 73 died from consumption, that is *phthisis pulmonaris*, as distinguished from every other disease. That works out to 154 per 1,000, that is to say, 154 died from consumption out of 1,000 deaths from all causes.

42. How is that compared with the whole kingdom, or compared with other districts?—Shall I refer first of all to the non-quarriers in this district?

43. Yes, if you please—Amongst those not employed in the slate quarries there were during the same period 300 deaths from all causes, and out of that 300 there were 52 deaths due to phthisis, which means 173 per 1,000. Therefore, amongst those not employed in the quarries the number of deaths from phthisis was 173 per 1,000, as compared with 154 per 1,000 in the case of the quarryman. Table IX.

44. (*Mr. Greaves.*) Leaving a clear advantage to those engaged in the quarries?—I should not like to say that myself. That is what the figures show, but there are some considerations to be looked at in comparing the statistics. We ought to compare them, say with joiners or shoemakers as a class, or with masons and so on; but that is impossible in Festiniog, because the number of each of those classes is so small in comparison to the number of quarrymen. However, an approximate idea may be obtained from these figures.

45. (*Chairman.*) As far as these figures go, they show that the person employed at the Festiniog quarries or mines suffers less from consumption than the average person in the district?—So far as these figures go, they prove that the Festiniog quarrymen, taking them as a class, die from phthisis at the rate of 154 out of 1,000 deaths from all causes, whereas the males over 14 years of age in the same district who are not employed at the quarries die from phthisis at the rate of 173 per 1,000.

46. (*Mr. Jenkins.*) Both these tables apply to males? Yes, to males over 14 years of age.

47. (*Mr. Greaves.*) Giving an advantage to males in general of 19 per 1,000?—Yes. I should like to refer to some figures prepared for the Registrar-General; I find that Dr. Ogle, the late Superintendent of Statistics has prepared a comparative table of the deaths in different occupations, and he works out that the relative mortality figure of the quarryman is 1,122. He works it out in this way. He takes the males between the age of 25 and 65 throughout the whole of England and Wales, and he finds that 1,000 males between those ages die out of every 64,641 males living between those ages. It was a very difficult matter to make a comparison with the quarryman, because we have not such a number as 64,000 quarrymen, but I have taken all the deaths below the age of 25 and above the age of 65 out of the 473, and I find that there are 150 deaths outside the limits of those ages. This brings down the 473 to 323, which represents the number of deaths amongst those engaged in slate quarries between 25 and 65 years of age for the 10 years. My difficulty was to arrive at an estimate of the number of men employed as quarrymen who are between those ages, and who live in the district. I have put the figure at 2,000, but I do not know whether that is right or not. Taking 3,500 as the total number of all engaged in the quarries, I have deducted those below 25 and above 65 years of age, and I consider there are 2,000 men left who are between the ages of 25 and 65. I have done that in order to arrive at the per-centage, and I find that the figures, worked out in that way, show the relative mortality figure of the Festiniog quarrymen to be 1,043.

48. (*Chairman.*) As compared with the 1,122 of Dr. Ogle?—Yes. The 1,122 is the figure for the stone and slate quarriers throughout the whole of England and Wales.

49. Therefore, there is a considerable advantage in favour of the Festiniog quarrymen?—Yes, they compare favourably with the figures given by the Registrar-General with regard to stone and slate quarriers throughout the whole of the country.

50. Then the Festiniog quarryman enjoys longer life than the average quarryman of England and Wales?—Yes, he does, according to Dr. Ogle's figures.

51. Do the men suffer more from phthisis than the women?—I have not prepared any table as to that, but my impression is that women suffer more from consumption than men do in this district. I cannot put it as a fact, because I have no figures to prove it, but that is my impression.

52. (*Mr. Jones.*) Have you got the total figures as to the deaths from consumption?—No, I have not taken females and children into account in my table, because I thought it would not be a comparative table of quarrymen. There is a table that perhaps might throw some light upon it. Table 5 gives the number of deaths including those from diseases of the respiratory organs in this district. That is what I go upon mostly. During the 10 years, between 1871 and 1880, taking the whole of England and Wales, there were 3·76 per 1,000 of the population who died from diseases of the respiratory organs, whereas in the Festiniog urban district from 1880 to 1889 the deaths from those diseases were at the rate of 5·35 per 1,000 of the population. In London, for the period from 1871 to 1880, the rate was 4·6 per 1,000 of the population. This shows that these diseases are higher in this district relatively than they are throughout England and Wales and than they are in London.

53. (*Mr. Greaves.*) Does that take in the whole of the population?—Yes; it includes women and children.

54. (*Mr. Jenkins.*) And it also includes all diseases of that character?—Yes; all diseases of the respiratory organs. Phthisis among females and young children is higher than it is among males. I believe that in considering this question of deaths from consumption in this district, there are other things that ought to be taken into account. There is the geological formation of the district. We know that the dip of the strata is against the natural fall of drainage, and there is always an accumulation of under-ground water. Our houses are faulty, in that no provision has been made to prevent the evaporation of this underground water. There is no asphalt or anything of that kind in the basement of the houses, and we have no system of drainage. It has been proved beyond a doubt by Sir George Buchanan and other authorities that where we have satisfactory drainage and systems of drains, the deaths from consumption are reduced. In Salford it was reduced 45 per cent., and in Banbury 41 per cent., and it is a recognised fact that the deaths from consumption are in that way very much reduced. I therefore put that down as one cause of the prevalence of diseases of the respiratory organs in this district. This question of phthisis I refer to particularly in relation to the condition of the men who work under-ground, compared with those who work in the mills (dust inhaling). To my mind, it is a very difficult thing to prove exactly the relation between these two factors—the cause and the effect—because in the first place one is struck by the absence of initiatory symptoms, such as chronic cough, asthma, and so on, which we get in other occupations where phthisis is met with. We get premonitory symptons which ultimately lead to consumption. In Festiniog these are absent in a great measure, though not entirely, and one is struck by the fact. I only know of one case of Emphysema in the whole of Festiniog. I do not know of anyone who has performed a *post-mortem* examination of the lung of a quarryman in this district, and in the absence of that, I find a difficulty in arriving at a proper conclusion. But this I will say, that the tendency of all diseases of the respiratory organs in this district is to assume a low type (adynamic). As factors in considering this question, I would mention the want of proper ventilation in the bedrooms of the quarrymen, the dampness of the surrounding soil, the nature and quality and mode of cooking their food, and the cold and wet that they are exposed to. In addition to this, there is the question of slate dust. How far that goes as a consideration I cannot prove. Slate dust will undoubtedly irritate. That is the primary effect of it, and perhaps it will set up inflammation which will lead to chronic phthisis, which we find the quarrymen of this district suffering from.

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55. (*Mr. Greaves.*) That is entirely presumptive?—Yes; I have no means of proving it.

56. Some of your statistics have gone to prove that the quarrymen are remarkably free from these complaints?—Yes; compared with the rest of the male population.

57. Those who work in the quarries live under more favourable conditions?—Yes, presumably.

58. (*Chairman.*) If you take the men employed above ground in the sheds, is not their death-rate from consumption higher?—Yes; it is. I have a table prepared as to that Table VIII., which shows that in the case of quarriers employed above ground, the number of deaths from phthisis out of 1,000 deaths from all causes is 236, whereas the number in the case of rockmen and miners is 140 per 1,000, which is of course a considerable difference.

59. But may not that fact be partly due to the fact that the man who is in the mill sits down in a cold and draughty place, whereas the man who works underground is differently situated. Is it certain that it is the dust that makes the difference between the two men?—I would not like to say so. I have said exactly what I feel about the slate dust—that it does irritate, but whether it is enough to account for the difference I cannot say.

60. (*Mr. Greaves.*) You have already pointed out that the rockmen as a rule are more robust than the quarriers?—Yes, that is so.

61. Therefore the quarriers are more subject to every sort of disease?—Yes.

62. Whatever it might be?—Yes, quite so. On Saturday last, for instance, it was freezing, and I sent a thermometer down to floor L., as it is called, in the Oakeley Quarries and I found that it registered under-ground 46° 4 F. and above-ground 32° F. I took the temperature again yesterday when it was raining, and down at the bottom it was 46° F. and above-ground 45° F., so that there was a difference on Saturday between the above ground and underground temperature of 14 degrees, whereas, yesterday it was only one degree. That of course is not enough to enable one to form any conclusion.

63. (*Chairman.*) It is a matter of common knowledge that the man under-ground is much less exposed to variations of temperature than the man who works above-ground?—Yes.

64. (*Mr. Jenkins.*) It is healthier above-ground?—I did not say that. The man is not so exposed to changes in the weather under-ground. In connexion with the question of slate dust, I may say that I sent a letter to all the quarry managers in the district, asking them to give me the measurements of two slate mills in each quarry, and I have had a reply from every one of them. I afterwards prepared Table XIII. from the information supplied to me in that way, and I propose to put the table in. It contains the particulars of 18 mills, and gives the length, breadth, and average height of each, together with the number of sawing tables, the number of dressing machines, the number of doors and other openings, the number of boys and men employed in each mill, and the cubic capacity of each mill. I then made the following deductions:—for every sawing machine I have deducted 125 cubic feet; for every dressing machine 25 feet; and for the blocks, slates, machinery, &c., that are in the mill, displacing air I have deducted 50 cubic feet for every man employed in the mill. I find that the cubic space per man and boy employed in each mill ranges from 3,186 to 9,049, the mean average of all the mills per man and boy employed, being 5,019 cubic feet. The requirements of the Factory Inspectors, which are as a rule held sufficient, are that not less than 250 cubic feet shall be allowed per man, and if the men work overtime that not less than 400 cubic feet shall be allowed. The common diseases of the quarrymen are diseases of the respiratory organs in which pneumonia plays a very important part; rheumatism, with all its complications; and diseases of the alimentary system, such as indigestion and so on. I believe a great deal of the latter class of disease is due to the way in which the quarrymen prepare their tea. It is the habit of the quarrymen in this district to send a boy about half an hour before the meal time to an eating house, prepared by the owners for their comfort, with tea and sugar and water in the same kettle, which is put on the fire and boiled. It then stews there half an hour or more before the men come there to drink it. That habit, continued day after day for a number of years, is in my opinion the cause of the indigestion we find in this district, and other diseases which come as a consequence. They undoubtedly ought to have two kettles. They ought to boil the water in one and brew it in the other. I have been trying to preach this to them for a long time; but they will not be advised on that point. As to the habits of the quarrymen, I should say they are thrifty, sober, and cleanly. I believe they smoke a great deal too much. As to the food for the young, it is much better in this district at the present time than it was a few years ago. We have a large quantity of milk coming in now, and this is a great boon for the workingman. But the constituents of a nutritious diet are not supplied to the quarrymen as they should be. I believe that if anything could be done in this direction it would be the means of adding to the health of the men and reduce disease among them. They take bread and butter and tea far too often, and this leads to a want of stamina and inability to withstand disease when it comes.

65. (*Mr. Jones.*) Do you suggest that he should have proper meals in the quarry?—It would be a great boon to the quarryman if he could get a proper dinner.

66. Do you mean in the quarry?—Yes, in the middle of the day.

67. (*Chairman.*) What would you advise as a satisfactory diet?—I would supply nitrogenous food. At present they get none, except perhaps what is contained in the milk they use with their tea. They ought to get a good deal more than that, and they should also eat more fat.

68. (*Mr. Jones.*) Do you take in or leave out from your calculations that they get a dinner when they reach home?—I take that into consideration generally, but I am talking now of the meal which a man who works hard during the day requires in the middle of the day.

69. (*Chairman.*) Do you think he might add oatmeal porridge to his diet?—Yes, he could with advantage, and milk—or even buttermilk—would be much better than tea. I look upon tea simply as a stimulant. Its effects soon pass away, and it does not strengthen him, whilst it leads to various forms of disease of the stomach. As to clothing, I think that the quarrymen are very well clothed when they work. They wear a good deal of flannel,—flannel vests and drawers and stockings—and of course the non-conducting and hygroscopic properties of flannel tell very much in their favour. As to the dwellings of the quarrymen, I have already said what I think of them.

70. Are the barracks kept clean, and are they good in your district?—The barracks we have in Festiniog are not what they ought to be for the comfort of the men who live in them during the week. I do not think there are barracks in the quarries, and I am talking now of barracks outside the quarries. Our Local Board has lately had this question before it, and notices have been put in these barracks as to the number of men that shall be allowed to sleep in them. The number of men allowed to sleep in them has been reduced, and as the result of the investigations into the matter, four sleep now where six used to sleep.

71. Is it not a fact that they often sleep two in a bed?—Yes, it is. I know of a place where there is not sufficient breathing space for two men, and yet there are six men sleeping there—three beds with two men in each.

72. But cannot that be prevented by the Local Board?—Yes, it can.

73. By existing legislation?—Yes. There are regulations which apply to these places, and the owners or occupiers can be compelled to respect them.

74. Do you think that if these byelaws and regulations are enforced it will conduce to an improvement in the health of the men?—Yes, I believe so.

75. And is it not a fact in regard to some barracks that the men eat and drink and sleep in the one room?—I cannot recall a case of that kind to my mind now. I think they have a separate room to sleep in.

76. I believe it was the case not so very long ago?—I should not like to speak as to that, because I do not know.

77. (*Mr. Jones.*) What do you say as to the condition of these barracks independently of the number of men who sleep there?—The majority of them are in an insanitary condition. I could mention a case now, where I

have a patient in a barracks suffering from erysipelas. There are six men living in the same place, and they must sleep in that room. They cannot get rooms anywhere else.

78. (*Chairman.*) Is that not a highly infectious disease?—Yes.

79. And is not that a public scandal?—Yes, it is.

80. Is it not the duty of the Local Board to isolate a case of that kind?—Yes, but we have no infectious hospital. The inspector told the men that they must not sleep in that room, and they replied that they had no other place to sleep in, and that the people next door would not take them in, as they were afraid of them.

81. Is it not the duty of the local authority to provide a hospital where such cases as that can be received?—Yes, and it is provided in other districts.

82. And why is it not provided in Festiniog?—I cannot say.

83. (*Mr. Jones.*) You said that the slate dips in a certain direction?—Yes.

84. Supposing it dipped in any other direction, do you think the condition of the houses would be improved?—In the present condition of things you get an accumulation of under-ground water, and the presence of under-ground water under the houses is the cause of disease according to the opinion of the greatest authorities. If you remove that cause of disease you reduce the number of deaths from consumption, for instance, by nearly 50 per cent. That has been the experience of other towns.

85. (*Mr. Greaves.*) There would be a natural drainage if the dip were in another direction?—Yes, certainly.

86. (*Chairman.*) If you could raise every house in Festiniog and lay down a layer of concrete you would improve the health of the population?—Yes. I do not think there are a dozen houses in the place with such a provision.

87. (*Mr. Greaves.*) And not even a damp course?—No. I have also prepared a table as to accidents: Tables XI., XII. I have taken the Oakeley Hospital figures for the last 20 years—from 1873 to 1892—and have taken out the number of men who were brought into the hospital from the Oakeley quarries only. Years ago there were men taken there from all the quarries, but for the purpose of these tables I have only taken the Oakeley men into account. I have classified the accidents into five classes: (1) sprains, bruises, contusions, &c.; (2) head injuries; (3.) fractures and dislocations; (4) injuries due to blasting; and (5) internal injuries. During the first 10 years—from 1873 to 1882—there were 206 cases brought into the hospital, and in the last 10 years—from 1883 to 1892—178 cases. As to the number of men employed at Oakeley quarries I can give no information at present. Dr. Foster has prepared figures which give that information, but I have not got them by me just now. During the last five years men have been going to the hospital who did not go there in former years, because two other firms of medical men send their patients there. That is a point to be considered in regard to the number of cases treated, as only one firm was allowed to send patients there up to five years ago.

88. And yet they show a decrease in spite of that fact?—Yes, a slight decrease—178 as against 206. I believe that the number of accidents from blasting are fewer than they were, and also those from falls,—men tumbling over in the quarry and getting injured. Accidents of that kind are undoubtedly less frequent.

89. (*Chairman.*) Do you think there are more falls of rock upon the men than there used to be, and more injuries of that kind?—If we look at these tables we find that the number of head injuries in the 10 years between 1873 and 1882, were 39, whereas in the 10 years between 1883 and 1892 the number was only 29.

90. (*Mr. Greaves.*) The presumption being that these head injuries resulted from falls of rock?—Yes, that is my view of the matter, but of course I can not say anything as to that. I have not gone into the causes of the accidents in this table.

91. (*Chairman.*) It has struck me in going down the Narrow Gauge railway and seeing men come from the quarries, possibly wet, and sit down on the ground waiting for the train to come up, that they suffer in health from that. They afterwards travel in a railway carriage,—do they suffer more than men who can walk to their homes?—I have no figures to prove it, but I have no doubt, in my own mind, that exposure to cold and wet bears directly upon those men who are so exposed at a time when they are not doing any work to keep themselves warm. After having worked for hours in the even temperature down below, and coming into the colder temperature outside they are undoubtedly more liable to take cold and contract disease.

92. May not the Festiniog Railway be to the quarryman a sort of pneumonia trap?—Undoubtedly. A man who works in an even temperature for hours and comes up to a lower temperature would no doubt contract disease much more readily than another man.

93. Is the man who comes down by the London and North-Western Railway not better than off than the man who travels on the Festiniog Railway?—Yes. He gets into a carriage at once.

94. And is he not in a better carriage?—I do not know. In the one case he has to remain outside to wait, but in the other the carriage is waiting for the men.*

95. (*Mr. Jones.*) Can you give us the time that the men are kept waiting say—by the Festiniog and the London and North-Western and the Great Western lines in the mornings and in the evenings,—I am sure it has struck you?—They leave work in the summer months at 5.30 p.m., and the train starts for Dolwyddelen at 5.45, so there is just enough time for them to get to the station and jump into the train. It is different now. They leave off work at 5 or 4.45, and the train does not start until nearly 6 o'clock. That was the arrangement until quite recently, but this month the railway company have put on a special train to run at 5.15, and this train will be continued until the days lengthen. On the Festiniog Railway the men have about half an hour to wait before the train goes down.

96. (*Chairman.*) And all that would help on disease?—Yes, it would make him more liable to contract disease, and he would also suffer more from the effects of it.

97. Do you think it would be any advantage if a man had some place where he could change his clothes before going to work,—a place where he could take off his wet clothes and put on dry clothes?—I have no doubt that if a man had dry clothes to start with he would be better off than he would be in wet clothes.

98. Do you think that if they had a place of that kind prepared for them that they would change their clothes?—Yes, I think they would.

99. (*Mr. Jones.*) What is the difference as regards health between a man who lives a long way off and a man who lives close by?—I have no data on that point.

100. (*Mr. Jenkins.*) Have you not made any inquiries as to the sick funds at the quarries?—I have been trying to get at the figures, but I could not, because it is not in every case that a medical certificate is required, and it is not necessary to put the cause of illness down, so that you are at once met with difficulties if you try to get at the exact figures. They may do things now on a better system, but you must have the figures for 10 years at least before they are of any value, and as the figures for the last few years cannot be got accurately it is of no use trying to prepare a table.

101. But your figures go to prove that the quarrymen, taking phthisis alone, are better off a good deal than the rest of the population in this neighbourhood?—So far as they go, the figures go to prove that there are fewer deaths from phthisis among quarrymen, relatively, than among those who are not employed in slate quarries. But the comparison is not exactly correct. To make a proper comparison one ought to take one class of workmen—such as joiners or masons—and compare them with quarrymen, instead of comparing all those classes together with the quarrymen. I have taken them all together, because from the fewness of the number I was obliged to do so. There are, again, cases where men have worked in the quarry for some little time. A man of that class may commence business, say as a coal merchant, and if he is registered as such I include him in the non-quarrymen class, although as a matter of fact he may have worked in the quarry for a number of years. I have taken the figures from the registers kept by Mr. Thomas Roberts, the Superintendent Registrar, and by Mr. Daniel Humphreys, the registrar of births and deaths for the

* I refer to the Junction and Tanygrisiau stations on the Festiniog Railway.

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Festiniog Registration District. They do not include quarrymen living at Dolwyddelen, Bettwsycoed, Llanrwst, and the neighbourhood, nor those at Portmadoc, Criccieth, or Harlech. The men not included, however form but a small minority of those employed in these quarries.

102. You say that phthisis is more prevalent among women than it is among the workmen?—Yes, it is more prevalent among women and children.

103. That is your opinion?—Yes, but I have nothing to prove it. You get a large per-centage of deaths from diseases of the respiratory organs.

104. You said also that a great many of these men go to the quarry at the age of 18 and upwards from the agricultural district. Are they more subject to those diseases, or less so?—The majority of the men who go to work under-ground are men who start to work under-ground when they are 18 or 20 years of age. Fewer die from consumption among those who work under-ground than among those who work above-ground. One reason why they are less liable to diseases of that kind is that they start work there at an age which more or less protects them. 18 or 20 is a better age to start at than 14. I could not say what the case would be if all the men who work under-ground started at 14 years of age. I do not know what the proportion would be. It might be the other way about.

105. Have you ever taken special notice of these men—what is the effect upon their health after having worked under-ground say for a year?—If you look at them going from their work they look very much less respectable, so to speak, than those who work above-ground; but I do not know that you can very well distinguish between them if you see them in their Sunday clothes.

106. Do you know what number of men who are a little old there are who are working under-ground at the present time?—I cannot give an opinion, as I have not had the figures. I asked for the figures to be taken in one quarry, but I have not had them, and I do not know whether they have been taken or not.

107. You say that the older men work outside the quarry?—Yes, that is so.

108. Can you give a reason for that?—A man cannot work very hard when he is 60 years of age.

109. (*Mr. Greaves.*) A great many quarrymen retire—they leave the occupation at a certain age and go into other walks of life?—Yes, they do, very often.

110. Do they really retire, or do they die?—I know of some who have left the quarry, and who take other work in hand afterwards; but I could not give any figures to prove either one way or the other.

111. Are there many infectious diseases, such as typhoid and so on, in the district?—I am glad you have asked me that question. For the 10 years from 1865 to 1874 a report was prepared by Dr. Bloxall, of the Local Government Board, who visited Festiniog for the purpose of investigating the matter. He said that the average deaths from typhus and typhoid in Festiniog was at the rate of 12·9 per annum for the 10 years. Some time ago I prepared another table, from 1880 to 1890, and I found that the deaths from fevers—typhus and typhoid—were at the rate of 1·3 per annum for that period. In the one period of 10 years the rate was 12·9 per annum, and in the other 10 years 1·3 per annum. That improvement came in after the introduction of the Llyn Morwynion water.

112. (*Chairman.*) The number is 10 times as small now?—Yes.

113. It was reduced 9/10ths in 10 years?—Yes. Prior to that they got their water-supply from shallow wells and polluted streams.

114. (*Mr. Jenkins.*) Have there been any cases of that kind here of late?—I believe there have been eight or nine cases during the last few months.

115. And were they generally among women or men?—There were two cases in Newmarket Square—a girl of 14 and a boy of 12 years of age; a boy of three years at Tanygrisiau; a man of 35, who worked at the foundry at Tanygrisiau; and a man, named William Jones, at Dolrhedyn, who was 45 years of age. Those are the cases that have been notified.

116. (*Chairman.*) Do you think that any of the water of the district is polluted by drainage from the quarries, owing to the scarcity of privies; have any cases of fever been traced to pollution of water of late years?—I cannot recall a single case where it has been traced to the water-supply.

117. Do you think there is any chance of the water being polluted from the quarries at the present time?—No, it is highly improbable.

118. If sanitary arrangements are altogether absent or in anyway defective in the quarries, the population will not suffer in consequence?—It will not suffer from the water-supply becoming polluted.

119. (*Mr. Jenkins.*) What would be the effect of such a state of things upon the workmen themselves?—If there are defective sanitary arrangements, it would, no doubt, be beneficial to remove them.

120. (*Chairman.*) Then you think that as far as the pollution of water is concerned, there is no danger?—It is highly improbable that the water-supply of the town will be affected by any defective sanitary arrangements in the quarries.

121. (*Mr. Greaves.*) And the same water is supplied to the whole of the district?—Yes.

122. So there is no necessity to get water from any other source?—No, there is not.

123. (*Chairman.*) Do you think that there are sufficient ambulance appliances at the quarries in this district?—I think that if the men were trained to the use of the ambulance stretcher, it would be a great boon to them, but there is a great disinclination to use it. I believe there is one in almost all the quarries here, though I do not know exactly, but I know that the men do not like to use it. Why that is, I do not know. It would be a great improvement if they could be induced to use it.

124. What do they use?—They use a large box which requires four men to carry it when it is empty It would be a great improvement if they would use an ambulance, which they could carry anywhere about the quarry, and which would be much more comfortable for the injured. The box should be taken away from the quarry altogether.

125. Is it not desirable that a man should be kept warm and covered over after an accident?—Yes, undoubtedly. I know of cases where serious illness has resulted internally owing to the men having been carried about in an improper way, and not covered over as they should be.

126. (*Mr. Jenkins.*) And that sort of thing has resulted in death?—Yes. I know of such cases, where death has resulted from pneumonia. The case of William Jones, Talywaenydd, was one of them.

127. (*Chairman.*) And that might have been prevented by the use of a good ambulance?—Yes.

128. (*Mr. Greaves.*) Have any lectures been given under the Association?—Yes, I have conducted classes for the railway men and a few outsiders.

129. Would it not be a great advantage if the quarrymen could be got to join those classes?—Yes, it would be a great advantage. There have been cases where there has been loss of blood resulting in death, and these might have been avoided if the men had been instructed in ambulance work.

130. (*Mr. Jenkins.*) Do you know of any stretchers of that kind which are provided by the owners of the quarries?—I think there are three in the Oakeley Quarries, although I do not know for certain. I think there is also one at the Llechwedd Quarry.

131. A proper covered stretcher?—Yes. It can be made either open or closed, and it is much lighter than the old box, and easier to carry about.

132. Is there any provision made by the quarry-owners in cases of accidents?—There are two hospitals here. One belongs to the Llechwedd quarry and the other to the Oakeley quarries, where all accidents are taken in. The patients are attended to, and fed and nursed at the expense of the owners of the quarries, and there is no doubt they are a great boon to the neighbourhood.

133. Are those the only hospitals there are?—Yes, those are the only two in the place.

134. And they are supported entirely at the expense of the owners?—Yes.

135. (*Mr. Evans.*) Where do the other quarries send their injured?—They have to go home; but I have seen cases where it has been otherwise. Men who were injured and who lived outside, have been taken to the Oakeley Hospital, and a fixed fee paid for their mainte-

nance while they were there; but those cases are not frequent.

136. (*Mr. Jenkins.*) Are there subscribers to those hospitals?—The Rhosydd, Cwmorthin, Oakeley, Llechwedd, and Diphwys Casson, and I believe the Votty and Bowydd, and nearly all the quarries in the district used to subscribe towards the Oakeley Hospital years ago, but at present that is not the case.

137. (*Mr. Greaves.*) Did not two or three quarries subscribe *pro rata*, and the other quarries send their cases there at a certain fixed charge?—Yes, perhaps that is it.

138. (*Mr. Jenkins*). In your opinion these hospitals are very valuable?—Yes, very.

139. (*Mr. Evans.*) Have the men any objection to go to the hospital?—I have known men who did object, but those cases are very few indeed. Almost every bad case, where the hospital is available, goes there.

140. (*Mr. Jenkins.*) There existed a certain amount of prejudice?—Yes, there used to be a good deal at one time, but I think it is almost entirely done away with now.

141. (*Mr. Evans.*) Do you include all the diseases in your 1,043 that Dr. Ogle included in his 1,122?—Yes, I do. It is a very difficult thing to arrive at that figure, owing to the data being small. With the figures I have been able to get, it works out to 1,043, as compared with 1,122.

142. Do you think that there is as much dust within the quarry as there is outside in the sheds?—No, I do not think there is.

143. Do you admit generally that dust has a bad effect on the lungs of the men who have to work in it?—I have said before that I believe that the primary effect of slate dust is a mechanical effect. It irritates the part it comes in contact with, and it may be the means of setting up inflammation, which may develop ultimately into other diseases.

144. Do you think that slate dust is less injurious than granite dust?—It is certainly not so injurious, according to statistics which have been prepared on the point. I work it out that amongst the Festiniog quarrymen, out of 1,000 deaths from all causes, 154 are due to phthisis, whereas the proportion of the Cornish miners is 375 per 1,000.*

145. Do the Cornish miners die from the effects of dust or of damp?—The nature of the dust and its shape is put down by Dr. Ogle as one of the points for consideration. He has prepared a table which shows that amongst the coal miners, 126 die from consumption out of the comparative mortality figures of 891; amongst Cornish miners, 690 out of 1,839; and amongst stone and slate quarriers throughout England and Wales, 308 out of 1,122. The figures as to the latter work out to about 274 per 1,000; that is to say, throughout the whole of England and Wales 274 die from consumption out of 1,000 deaths from all causes (age = 25 to 65).

146. He does not distinguish between slate quarries and stone quarries?—No, he does not.

147. You are familiar with the sheds where the quarrymen work?—Yes, I am.

148. Do you when you enter those sheds find that they are very dusty?—In the summer months they are. When you enter them you find there is a lot of dust in them. You do not find it so much in the winter months.

149. Because there is not so much light to view it?—Perhaps, and possibly the dampness of the weather. In the dry summer months the dust dries quickly.

150. Did you notice whether these sheds are properly ventilated or not?—In Table XIII., which I have already referred to, I have a column for the number of doors and other openings for ventilating purposes, and I find that they vary from two and three up to 65 per mill. The 65 openings are in a mill which is 424 feet long and 64 feet broad.

151. Are those doors on the floors?—Yes, they are level with the floors. They are at the sides and ends of the mills.

152. But the dust generally rises up, does it not?—Yes, undoubtedly.

153. Do not you think that ventilation at the top would be better than ventilation at the sides?—Yes, it would be an improvement undoubtedly. It is so in some mills, I know.

154. Would you recommend their adoption generally?—I should say it would be a means of ventilation. I cannot mention any special form; but proper ventilation at the top would undoubtedly be an advantage.

155. (*Mr. Jones.*) Do you make this suggestion at the risk of making a draught in those mills?—I know that the men complain of too much draught; but I am asked now as to the best mode of ventilation.

156. (*Chairman.*) May not the draught be worse than the dust?—I believe it is almost impossible to ventilate a large mill with a cubic space of 5,019 cubic feet per man without creating a draught.

157. (*Mr. Greaves.*) Do you know, as a fact, that the mills where there are ventilators at the top are better than those where there are none?—I cannot say anything as to that.

158. Have you ever considered the weight of the dust and whether it floats?—Sometime ago I was writing a paper which bore on this question, and I got some of the slate dust, and Mr. G. J. Williams kindly examined it for me under the microscope. We collected some on a level to where the men were working, and some more a little higher up, and we found that the dust taken from the highest point was finer than that obtained lower down.

159. (*Chairman.*) There is a dust which settles on the rafters of the building?—Yes, and that is much finer than the other. The heavy particles fall down below, and the lighter ones rise up.

160. (*Mr. Evans.*) Have you ever had complaints from the men themselves that they consider that the dust affects their health from their point of view?—Yes, I find that the men complain of dust. They think that the dust is the cause of their illness, and many of them seem to believe that if they take a drink to wash the dust out of their mouth, they improve their condition,—say a glass of beer or water. It gets into a state of clay, and clings to the roof of the mouth.

161. The opinion of some doctors in the neighbourhood of the Carnarvonshire quarries is that the respiratory organs suffer more now from the effects of dust since the erection of the sheds; and that rheumatism on the other hand is decreasing. What do you think of that?—In the first place there is no *post-mortem* examination by which to prove it. We have rheumatism here, I know, but how it compares with the other quarries, I do not know.

162. (*Mr. Jenkins.*) You say that the primary effect of the dust is to irritate?—Yes.

163. And that it develops into inflammation?—Yes, it may. The primary effect is mechanical, which may lead to inflammation.

164. Could that develop into pneumonia?—It would not be the cause of pneumonia.

165. But could it develop into pneumonia?—It might, with other conditions, such as a chill, for instance.

166. Pneumonia never comes on without a chill?—That is one of the initiatory symptoms of the disease. It starts with a state of congestion in the lung.

167. Is pneumonia a prevalent disease in this district?—It is. A table that I prepared in 1890 shows that out of all diseases of the respiratory organs in the previous year (1889) 55 per cent. died from pneumonia. In that year, however, we had an epidemic of pneumonia here, and taking the 10 years from 1880 to 1889 the per-centage is 36·4.

168. (*Chairman.*) Is that a high per-centage compared with other districts?—I believe it is, but I have not been able to get the figures for England and Wales.

169. (*Mr. Jenkins.*) In your opinion the dust has nothing to do with it?—I do not say that it has nothing to do with it, but I should say it would require other conditions as well to produce pneumonia.

170. Have you any suggestion as to how the dust can be done away with except by means of ventilators?—I could not suggest anything. I have been thinking it over. You could not take it away by exhaustion shafts. If you had one of these above the dressing machine, the dust would be taken up, but there is dust in other

* Cornish miners between 25 and 65 years of age.

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parts of the mill, which could not be got rid of in this way. General ventilation, I should say, would improve it, or you could have a spray over it, say during the dinner hour when the men are not there.

171. (*Chairman.*) You mean watering the mill?—Yes.

172. But do not you in that way introduce another danger,—that of dampness?—Yes, you would, no doubt.

173. With regard to your figure of 1,043, is it not the fact that some of the Festiniog quarrymen would be living in other places and registered there, would that affect your figures?—At the end of the first table I make a remark to the effect that those who live outside Festiniog, in the districts I mention there, are not included.

174. And that would not really affect your main conclusion?—I do not think it would.

175. If those who live in these districts form but a small minority of the men employed in the quarries, they would not affect your figures to any considerable degree?—No, it would not.

176. (*Mr. Evans.*) Can you give an approximate figure as to the number of men who work in the quarries but live outside the district?—I should say that 500 would be the outside number.

177. (*Mr. Jones.*) You have now referred, so far as your tables go, to deaths. What about the small injuries which keep the men home from their work for a few days or weeks, injuries that are not even reported to the inspector, can you give the Committee any estimate of those?—The only thing I can say is that during the last 10 years, from 1883 to 1892, the number of small accidents—sprains, bruises, and contusions, &c. (Table XII.)—treated in the Oakeley Hospital was 62, as against 59 for the previous 10 years, from 1873 to 1882 (Table XI.).

178. Sixty-two cases were treated at the hospital in the 10 years?—Yes. Those are the minor accidents for that period.

179. In your practice you often find men coming in for small dressings?—Yes; I have seen as many as 15 in one morning getting their hands dressed.

180. (*Chairman.*) What would those be?—Small cuts on the hands. Those mostly occur amongst the men who work outside in the mills. Slabs and slates fall upon their hands, and so on.

181. (*Mr. Evans.*) Do you find that the quarrymen suffer from nervous debility to some extent?—Yes, I do.

182. What is the cause of that?—I believe it is a great deal due to the mode they have of brewing their tea, as I have said before.

183. You consider that that is one of the results of drinking bad tea?—Yes, and they also smoke too much; cases frequently come to me, and after inquiring into them I have to exclude all other causes, and I must come to the conclusion that smoking is the cause of the nervous affection they suffer from, they are not organic nervous affections, but functional diseases.

184. Are you of opinion that the men do not eat enough vegetable?—No, they do not.

185. Their general diet renders them liable to many diseases that they might escape if they had better diet?—I do not say exactly that that is the cause of disease amongst the men, but it makes them less able to fight with the disease when it does come. It reduces their stamina, as I said before.

186. (*Chairman.*) Do you think that the men's wives know enough about cooking to be able to give them better diet?—There is no doubt that if more cookery was taught in this district it would benefit the men considerably.

187. (*Mr. Greaves.*) Cooking lessons have been given here to a great extent, I believe?—Yes, that is so.

188. (*Mr. Evans.*) What kind of cooking has been taught,—is it plain cooking or fine cooking that they have been teaching?—Plain cooking for artisans.

189. (*Chairman.*) Do you find that the weaklings of a family keep away from the quarries and that the strong ones of a family go there to work, and does that make any difference in your figures?—For some years now that matter has been very carefully attended to, because a certificate from a certifying surgeon is necessary before any boy can be admitted to the quarry. If we find a boy suffering from any disease we refuse a certificate, and he is not allowed to work at a quarry.

190. Therefore the quarries have the best of the working population?—Yes, I believe so.

191. And therefore, other things being equal, they ought to live longer?—Yes, they ought to have a better average life than the other men.

192. If you take the strong ones to certain work, and weed out the weak ones, the strong ones ought to be expected to live longer than the weaklings?—Yes, certainly.

193. (*Mr. Jones.*) But that system has been introduced so recently that it does not affect your tables, I suppose?—No, it does not. That practice has only existed during the last three or four years, so that it does not affect my figures very much.

Mr. J. Hughes.

Mr. JOHN HUGHES, Penlan, Festiniog, examined.

194. (*Chairman.*) What is your occupation?—I am doing nothing now.

195. Then what was your occupation formerly?—I was a quarryman. I worked at the Llechwedd Quarries for 27 years.

196. Did you work above-ground or under-ground?—Under-ground.

197. As a rockman?—Yes.

198. What have you to tell us with regard to the means of making your occupation less dangerous to health, life, and limb?—I have not prepared a report, but I have come here to answer any general questions you may have to put to me as to the quarry.

199. What do you think are the principal dangers to which the quarryman is exposed?—I believe that at the Llechwedd Quarry there is one thing that is dangerous, and that is the path from the under-ground up to the bank.

200. You are speaking now of one particular quarry?—Yes, of the Llechwedd Quarry.

201. And what is the danger you are referring to?—They have three trucks to every rope. There are three ropes, so that there are nine trucks on the incline.

202. Is it not a fact that there are paths provided for the men at Llechwedd?—Yes, there are, but there are four floors without that.

203. (*Mr. Greaves.*) Which floors are those?—We call them "from the Old Floor to the top of the incline." I do not recollect the names.

204. Are they in the light or not?—Two are above ground, and two are under-ground.

205. Are they in the light or not?—The path is in darkness for one-and-a-half floors, the rest is in the light.

206. (*Chairman.*) Is there not enough light for the men to see in the part you call dark?—No, there is not.

207. But there is from that up to the top?—Yes.

208. Without referring to any particular quarry, would you advise that a path separate from the incline should be provided in all cases for the men to go to and return from their work?—Yes, I would. I may mention one particular case in the Llechwedd Quarry in which I myself nearly met with a fatal accident while going up. A truck nearly tumbled over me.

209. Was that on the portion of the incline that you complain of?—Yes.

210. Is there any other improvement that you could suggest?—Yes, I believe I can refer to another matter in connexion with the miners which ought to be attended to. When "roofing" in the old vein there is a little thickness of 4 inches, and another thickness of 9 inches, and as a rule the miners work the "9-inch" in such a way that it may all come down together. I have known of accidents where men have been killed in consequence of that sort of thing.

211. Whose fault do you think it is that the "9-inch" is not brought down in smaller portions?—In some cases I have heard miners say that they get 7*s.* 6*d.* a yard for opening, and in some instances they only get

6*d.* a yard for pulling down the 9-inch. They so work it that it comes down by its own weight, and they do that for the sake of earning a little extra money. The result is that accidents happen, and in some cases men lose their lives in consequence of that mode of working.

212. You say that the man has lost his life by trying to get it to fall down of itself in that way?—Yes.

213. And he does that although he knows that the practice is dangerous?—Yes.

214. (*Mr. Greaves.*) Do you know that some of the quarries work under special rules?—Yes, I do.

215. Do you know the 82nd rule of those special rules?—I cannot refer to it now, but I have seen those rules.

216. The 82nd rule directs that a quarryman shall before commencing work, especially after blasting, make a careful examination of his working place and remove any loose rock that may be dangerous?—Yes, I know of that rule.

217. And if a quarryman or a miner neglected to do that he would be breaking the rules of the quarry, would he not?—Yes, but I was not referring to that rule when I made the statement as to the "9-inch." In my opinion that method of letting work to the men endangers life.

218. (*Mr. Jenkins.*) What would you suggest in its place?—I would suggest that there should be a clear understanding that nothing should be left overhead while it is loose.

219. (*Chairman.*) Is that not fully provided for by the special rules at present in force?—Whether they are provided for or not the thing is not done.

220. (*Mr. Evans.*) If the men break the rule in working in that manner, the manager as well breaks the rule in allowing it to be done?—Yes, that is what I mean.

221. (*Chairman.*) You mean that the rule is not sufficiently enforced by the manager?—Yes, and I believe he does not obey it himself either.

222. You mean that the manager disregards the rule as well?—Yes.

223. (*Mr. Jenkins.*) Are the men generally well informed in regard to these special rules?—No, I do not think they are, but I know that in the Llechwedd Quarry there are plenty of opportunities for the men to know all about the rules.

224. (*Chairman.*) Do you know that if a man asks for a copy of the special rules he can have one?—Yes, I believe that is so, and they are posted up in all much frequented places in the works.

225. (*Mr. Jenkins.*) Is it the duty of the managers to enforce these rules?—I believe it is. With regard to the rules, what I mean is this,—there is greater care taken to adhere to the rules than there is to preserve life, and if the rules are favourable to the preservation of life then the rules are adhered to.

226. (*Chairman.*) Are there any rules in those special rules that are not favourable to the preservation of life?—I believe there are many of them that we would be just as well off without them as with them.

227. But are there any which, if carried out, would do harm to health or life or limb?—No, I do not mean to suggest that, what I mean is that the manager's object is to obey the rules, and so keep himself clear of the clutches of the law.

228. I gather from you, then, that some of the rules are harmless?—(*No answer.*)

229. Do you consider that some of the rules might be left out with advantage?—Yes, I believe that some of them might very well be omitted.

230. (*Mr. Jenkins.*) What would you say as to the 73rd rule as to the use of wooden rammers; do you think that rule practicable?—My opinion is, and I have had 27 years' experience, that there is no danger in using an iron rammer if you put proper wadding on the powder. That is my opinion.

231. Then do you think that that 73rd rule is at all practicable?—No, it is not.

232. Can you ram down explosives and the first second and third layers of tamping with a wooden rod?—It is quite impossible to do so.

233. What is the impossibility?—When we are going to blast and want to get a pillaring on the slate rock we never put more than half an inch of tamping, and less than that very often. A thick tamping, such as would have to be put if we used a wooden rammer, would injure the stone.

234. (*Mr. Jones.*) Suppose you have only one tamping could you put it firm enough to get a good "pillar"?—No; as a rule it cannot be done.

235. (*Chairman.*) Have you ever suggested any alteration in that rule?—I have never had an opportunity of doing so.

236. Why not?—No one has ever asked me.

237. Is my name and address posted up at the quarry?—Yes, it is.

238. If you considered the rule could not be carried out, why did you, or somebody else, not write to me to ask that the rule should be changed?—I would suggest that you should have some method of meeting the men who are in the habit of working under-ground, at some convenient centres, so that you could get the opinion of practical men on the matter.

239. (*Mr. Jones.*) Were the men consulted at all before the special rules came into operation?—I am not aware that they were consulted in the matter at all.

240. (*Mr. Jenkins.*) Are all these rules enforced; is the 73rd rule, for instance, in operation. I mean the rule as to the wooden rammers?—No, that rule is not in force.

241. (*Mr. Greaves.*) What tampers are used?—Iron.

242. Are not copper ones used?—The copper ones are kept on the shelf ready to be shown if anybody comes there.

243. (*Mr. Jenkins.*) Have you seen any used yourself?—I have, but very seldom.

244. Taking these rules as a whole, are they in your opinion good rules?—I believe their object is good, but they are wanting in practical knowledge as to how slate quarries should be worked.

245. (*Mr. Greaves.*) Do you say that the managers let this "roofing" to the men in a manner which they know to be dangerous?—I cannot say what their knowledge is, but I know of many things which they ought to have known.

246. (*Mr. Jones.*) In your opinion, would it be better to let the "9-inch" together with the "2½ feet" and make no difference in price between the two, that the one should be included in the other?—Yes, that is my idea of what should be done.

247. (*Mr. Evans.*) I see that a great many fatal accidents have happened from the falling of stones, or falls of part of the ground.

248. Could you tell us what was the nature of those accidents?—My opinion is that there will be more of those accidents in the future, because in opening they open in the big thickness, and that is opened in two or three chambers. It seems firm enough at first, and after opening to a certain distance they cannot get at it.

249. Leaving the future out of the question for the present, what has been the cause of the falls that have taken place in the past?—As a rule, I think they are beyond the reach of investigation.

250. Do many of the accidents happen owing to pieces falling from the face of the bargains where the men are working at the time?—Yes, some of them happen in that way.

251. Do you think that the men are careful enough to examine their bargains in that respect?—I hardly think that, as a rule, they make a proper examination of them.

252. Can you point to any accidents that have taken place owing to the carelessness of the men in that respect?—No, I cannot with certainty, because although one may have good reason to believe that that was the cause, the men, as a rule, give a different account of the matter.

253. Are the men supposed, after taking a bargain for a certain time, to keep it in a safe and proper condition until their contract has expired?—As far as I know, there is no condition of that kind mentioned when a bargain is let.

254. But what is the general understanding in that respect?—As far as I am aware there is nothing, except that a man takes proper care of his own life.

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255. Are the officials of the quarry supposed to examine these bargains daily or at any particular interval, or how?—As far as my knowledge goes that is not done unless a man makes special application for it to be done.

256. Then it is not understood that they are responsible for keeping the bargains in a safe condition?—I have never seen or heard of anything in that direction myself.

257. Do you think that the official should be made responsible for the safety of the bargains upon which the men are working, and that he should make a periodical inspection of the bargains?—Yes, I thoroughly believe in that.

258. Do you at the present time find any difficulty, with the light you have, in examining your bargains properly?—It is not possible with the light that the workmen have at present.

259. Then you think there is a deficiency of light to enable you to keep your bargains in a proper state?—Yes, there is.

260. (*Mr. Jenkins.*) Is it understood that a man is to keep his bargain safe while he is working it?—I do not think it is understood.

261. (*Mr. Greaves.*) Does the state of the bargains not alter every day after blasting?—The place where the blasting takes place is bound to change.

262. (*Mr. Jenkins.*) With regard to the face of the bargain?—Yes.

263. (*Chairman.*) There are a certain class of accidents which happen through falls of stone from a height of 30 or 40 or 50 or 60 feet, from places out of the men's reach and control; what suggestions have you to offer with the view of preventing accidents of that kind?—As far as I know, nothing can be done unless ladders long enough are employed, in order that proper inspection may be made of such places.

264. How often would you advise those inspections to be made?—I consider that every place where men work should be examined at least once every three months.

265. With the aid of ladders?—Yes. One reason for that is, that when men in blasting use a good deal of powder, the rock may be loosened, and it may afterwards fall, through dampness or some other cause.

266. (*Mr. Evans.*) There is another class of accidents which we have to inquire into, which are non-fatal. Do you meet with many of these accidents?—Yes, I know of several that have taken place with cranes, and so on.

267. Have you any stoppers on your cranes?—No, we have not, and that is what we have found to be the cause of a good many accidents in the past.

268. Do you think there ought to be stoppers on the cranes?—Yes, by all means.

269. (*Chairman.*) Do not many of the crane accidents happen when a man is lowering a block of slate?—Not so many, but there are some which happen in that way. Very often a handle comes off, or a sudden pull causes an accident owing to the chain slipping down.

270. What do you use to stop the crane; to prevent its turning back?—As a rule, they have a piece of chain to put in the cog-wheels.

271. (*Mr. Evans.*) Do not you think that a ratchet wheel ought to be put on such cranes?—Yes, I think it would be a great improvement.

272. Do you use ropes at your quarry?—As a rule we use chains underground.

273. You consider chains safer than hemp ropes, I suppose?—Yes, because the rocks are so damp.

274. (*Mr. Jones.*) Do you know that in former times a brake used to be put on the cranes?—No, I do not.

275. Then you cannot tell us why it was discontinued?—No, I cannot. The men were formerly in the habit of using their feet to remove the rubbish which had accumulated under the blocks, but they have long rakes provided now at the Llechwedd Quarry to remove such. I think this is a great improvement, and that a great many accidents have been avoided in consequence.

276. (*Mr. Evans.*) Would you suggest any rules instead of the present rules, or to make up the deficiency of the present rules?—I would suggest that there ought to be practical men in every quarry who should frequently visit the chambers to see that the places are safe.

277. Who do you propose should do that, the officials of the quarry, or who?—I consider that there should be an official appointed to visit the quarries oftener than Dr. Foster does, and to see that there is every precaution exercised.

278. (*Chairman.*) Do you mean under Government or under the quarry owner?—I mean under Government.

279. (*Mr. Evans.*) How often do you think that person should visit the different parts of the quarries?—I should like him to be as irregular in his visits as possible.

280. But would you not fix a certain number of times a year for his visits?—I think he ought to be on the spot—among the slate quarries—continually, and no one ought to know where he was or when to expect him. I think that the preliminary announcements of Dr. Foster's visits enable arrangements to be made to prepare for his visit and for things to be made ready for him.

281. (*Chairman.*) When do you say that I give preliminary announcements of my visits?—I do not say that you do, but the time of the visit gets out in some way or other.

282. (*Mr. Evans.*) Do you suggest that things are made to look well before his inspection?—Yes.

283. (*Mr. Jenkins.*) Do the men generally approve of his inspection?—I believe that Dr. Foster stands very high in the estimation of the men.

284. (*Mr. Greaves.*) He insists upon the observance of the special rules?—Yes, he does.

285. (*Mr. Jenkins.*) Do they think that accidents are prevented in that way?—I believe that these rules are advantageous to the preservation of life.

286. With regard to the accidents from falls, do they generally occur owing to negligence on the part of the workmen themselves in cutting the pillars?—I believe that they happen in both ways; they are not altogether due to the carelessness of the men nor altogether to the carelessness of others.

287. You admit that the men do not cut the pillars properly and leave them always in a proper condition?—Yes, I do.

288. Upon whom would you put the responsibility of seeing that the pillars are left in their proper condition?—I put the responsibility to rest in two places, but chiefly on the manager.

289. (*Mr. Evans.*) Are the pillars kept in their proper width?—Not always, I think.

290. (*Mr. Greaves.*) Do you mean to say that a quarryman would knowingly work his bargain improperly if he got a chance, without the supervision of the manager?—I believe a great many would do so.

291. Knowingly?—Yes.

292. (*Mr. Evans.*) Do you know of any accidents that have taken place in consequence of cutting down the pillars too much?—Yes.

293. And does that kind of thing go on now?—Yes, I believe that at the present time there are some who do it.

294. Are the pillars cut at the same width from daylight to the bottom?—No, they are not.

295. Are they broader at the bottom?—I believe they vary, sometimes they are, and sometimes not.

296. Which do you think they should be, less or more?—I consider they ought to be wider at the bottom.

297. Why should they be wider?—Because by allowing them to be wide at the top they would be certain to overhang, and so leave a space underneath.

298. As you go down from floor to floor should the pillar be wider?—Yes.

299. (*Mr. Jenkins.*) Is there any undermining of pillars going on, as far as you know?—Yes, I believe there is.

300. I mean cutting too much from the pillar with the view of getting good slates?—Yes, it is to that that I referred just now when I said that accidents happened.

301. And do you think that practice should be stopped and the pillars kept at their proper strength?—Yes, I do.

302. What do you mean by the "big thickness" that you referred to just now?—What I mean is the thickness of about 2½ feet which overlies the clay slant, and which is sometimes firm and sometimes loose.

303. Is it similar to the 9-inch?—Yes, it is as to hardness.

304. Is there always a slant above it?—Yes.

305. Does it occasionally get loose and come down of itself?—Yes, there are instances where it has come down of itself.

306. What suggestion have you with regard to that; do you suggest that it should be taken off at first?—It depends entirely on the nature of the rock, that is, whether there are many "bevels." If there are not many bevels, there is no danger.

307. Is it generally left?—Yes, in places where the rock is free from bevels.

308. It can safely be left in that condition, you think?—Yes. It is quite as safe, in my opinion, as anything that overlies it when there are no bevels of that kind.

309. What about the bed of the slate rock in the Llechwedd Quarry; is it thick, as at the Oakeley quarries?—I do not know what it is in the Oakeley quarries. I have never been there. I think it is about 24 yards at the Llechwedd Quarry from the clay-slant, but it is not the same thickness everywhere there.

310. (*Mr. Evans.*) Do you know of any accident that has taken place through working one floor too near to another floor?—I have never seen that done at the Llechwedd Quarry.

311. (*Mr. Jenkins.*) Are there inspections made at the present time at the Llechwedd Quarry as to dangerous places?—They come whenever they are called upon. I do not know that they go in any other way except that, but I cannot say that they do not go.

312. You do not say that they do not go?—No.

313. (*Mr. Evans.*) When they are asked to go they do so?—Yes.

314. And they make a proper inspection?—Yes. There are ladders to use if necessary, and there is a certain lamp to light.

315. (*Chairman.*) Have you any other suggestions to make?—I should like to make some suggestions as to young men becoming rockmen. Very often it is the case that a man takes a relative or a friend who has been working with a waggon and puts him to work on the rock. In such cases friendship or relationship may be the reason for selecting him, rather than any fitness for the post.

316. (*Mr. Greaves.*) Do the men choose their partners or rockmen without any reference to the manager?—I am not referring now to partners, but I know of instances where rockmen have been taken on without any reference at all to the manager. What I would suggest is that no man be employed to pull down the rock, or to have anything to do with blasting, unless he is examined first of all as to his knowledge. In the case of blasting, he ought to be tested as to his knowledge of powder and how to use it.

317. (*Chairman.*) Have you any other suggestion to make?—No, I have not.

318. (*Mr. Jones.*) Do you mean to imply that the young men are not under the supervision of the bargain-taker?—They may be and they may not. He may take them from a feeling of friendship or relationship, and many accidents may be accounted for by the want of experience on the part of the men.

319. (*Mr. Evans.*) Are many of the men taken from the waggons to work on the rock at the Llechwedd Quarry?—It may be said that they have all been taken from the waggons. The men who have not been taken from the waggons are the exceptions.

320. (*Mr. Jenkins.*) You mean as rockmen?—Yes.

321. (*Mr. Jones.*) How soon after they begin to work on the rock are those men entrusted with the use of powder and allowed to take part in the blasting operations?—I think I can refer to many instances where men have been allowed to do that in a day or two after commencing to work on the rock.

322. (*Chairman.*) Have you anything else to say as to powder?—No.

323. Or other explosives?—No.

324. Or as to machinery?—No.

325. (*Mr. Evans.*) Have you any machinery from which the men may be in danger?—No, I know of no piece of machinery which is dangerous with the exception of the crane.

326. (*Chairman.*) And as to the cranes, what would you suggest beyond putting the ratchet-wheel and pawl?—I would suggest that a man be appointed by the master whose duty it would be to see, once a week at least, that the chains and so on are in proper order.

327. (*Mr. Jones.*) You mean the chains, blocks, and so on?—Yes.

328. (*Mr. Greaves.*) Do you know of special rule 81. which says that every person shall, before commencing work and whilst at work, satisfy himself of the safety of any chain, crane, and so on?—Yes; but my suggestion is that a man—not the workman himself, but a man representing the master—should go round at least once a week to see that everything of that kind is in order.

329. If any defect is reported, is it at once attended to or not?—I do not know anything as to that.

330. (*Mr. Evans.*) In cases where there is machinery in use in the quarries which may be dangerous to the men, do you think that there should be a periodical inspection of it?—Yes, that is what I mean.

331. All pieces of machinery should be examined in that way?—Yes. A great deal of responsibility is placed upon the workman as to the observance of the rules, but I would suggest that a man should be appointed to go round to see that the rules are properly observed.

332. (*Mr. Jenkins.*) Would that tend to make the workmen themselves more careful, do you think?—It might do that; but what I mean is that the defects would be remedied.

333. (*Mr. Jones.*) Do you mean to imply that all the workmen are not quite capable of finding every possible defect that may exist in a chain, or a block, or a crane, but that an experienced man would be able to do so?—Yes, that is it exactly.

334. (*Mr. Greaves.*) Would not a defect in the crane, or chain, or any other appliance be much more readily found out by those who use it than by an inspector who would go round and casually look at it?—There are many defects in cranes that an ordinary workman would not be able to remedy.

335. (*Mr. Evans.*) Do you think it is possible that the men would sometimes run the risk of working with a defective appliance rather than ask for it to be examined?—Yes, there are scores of instances of that kind, and that is my reason for suggesting that a man should go round once a week to see that the chains and other appliances are in working order, without waiting to be asked to go by the men.

336. Have you anything more to suggest?—No.

337. (*Mr. Jenkins.*) What about the sanitary condition of the Llechwedd Quarry; is there any proper accommodation there in the way of privies?—No, there are none deep underground, and their absence causes a good deal of impurity in the atmosphere.

338. (*Chairman.*) What would you suggest to remedy that?—There should either be provision down below, or provision for the men to go up.

339. (*Mr. Greaves.*) Are there any privies underground at all?—Yes, there are in the Old Floor.

340. And are there any on the surface?—Yes, there are. The lowest one underground is on the Old Floor.

341. (*Mr. Evans.*) Do you drink the water in those lower depths in the summer time, when you are thirsty?—I do not think there is much of that; the instances of that are very rare.

342. (*Mr. Jenkins.*) The water above ground is pure?—I believe it is; it comes down from the mountain in pipes.

343. What about inquests,—do you think they are carried on properly?—No; I do not.

344. (*Chairman.*) What is it that is defective in the inquests?—The men do not give the evidence that they could give; and it is through fear.

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345. Fear of what?—They fear that if they told the truth it might cause them inconvenience in the quarry.

346. (*Mr. Jenkins.*) Do you know of your own knowledge of any facts that have been suppressed at inquests?—Yes; I know of some. I recollect that in one case Dr. Foster summoned men once, and evidence was kept back. I am referring now to the giving of evidence generally, and not to inquests specially.

347. Do you know of facts which the men have not felt at liberty to disclose?—Yes; and that is a thing that is generally felt.

348. (*Mr. Greaves.*) Is it generally felt that people do not tell all that they know?—Yes.

349. What do you mean by that?—They hesitate to tell all they know, lest it should be to their disadvantage in earning their living at the quarry.

350. Not tell all that they know under what circumstances?—Under such circumstances that the evidence they could give would be unfavourable to the proprietor or the manager of the quarry.

351. Do you mean at inquests or prosecutions, for breaches of the rules, or what?—You can take both cases; and generally in connexion with the quarries.

352. (*Chairman.*) Do you mean that the men are afraid to speak the truth?—Yes; they are.

353. (*Mr. Greaves.*) And you say that they do not tell the truth?—It is in this way; a man will give everything for his life, and he would sooner give up everything than forfeit his livelihood.

354. Do you mean to say that a man would forfeit his livelihood by telling the truth?—Yes; I believe that many men have done so before now.

355. (*Mr. Jenkins.*) Is that a demoralised state for the man to be in?—I cannot say; it is of course very humiliating that men should have to do that, but I have a good deal of sympathy with men who are anxious to retain their employment, and who fear that they would lose it if they spoke the truth.

356. Do you know of any witnesses who have been kept back at inquests?—I do not want to go into details in that direction; but as a matter of fact men are afraid to give evidence. Dr. Foster himself has been bringing cases forward, and he could not get sufficient evidence, because the men would not come forward to say what they knew.

357. (*Mr. Jones.*) You say you do not want to go into the details of cases which are within your own knowledge?—Yes; I do say that.

358. (*Mr. Greaves.*) Why not?—Because I would have to bring other persons into the matter, and I do not want to do that.

359. (*Mr. Evans.*) Do you think that the men are afraid to give evidence before this Committee?—I believe that but very few will come; and that the truth will be very sparingly given.

360. (*Mr. Greaves.*) Why?—Only because they are afraid to come.

361. Why are they afraid?—There are in Festiniog and Carnarvonshire scores of men who have been deprived of their livelihood for speaking the truth.

362. Can you instance one case where a man has been stopped from working for telling the truth?—No, I cannot; because they are stopped for other reasons, and nobody knows what they are.

363. You say the men dare not tell the truth because they are afraid of being deprived of their work, and that men have been deprived of their work for telling the truth,—can you give us a single instance of that?—It is said that they are deprived of their livelihood for other reasons, which are not known to people.

364. But you said just now that they were deprived of their work for telling the truth?—Yes; it was for telling the truth that they lost their employment; but that was not the actual reason given to the public for their dismissal.

r. T. Evans.

Mr. THOMAS EVANS, Barmouth, examined.

365. (*Chairman.*) What is your occupation?—I am a mineral agent and quarry manager.

366. You have been engaged in mining and quarrying all your life, I believe?—Yes, I have.

367. For how many years would that be?—I worked at Festiniog for about seven years when I started life.

368. And how long would that be ago?—It would be about 34 years ago.

369. (*Mr. Greaves.*) Were you working in the quarries at that time?—I worked in the Rhiw Quarry—in fact, I have worked at all the Festiniog quarries pretty nearly.

370. (*Chairman.*) And you are now owner of a quarry?—Yes, I have two quarries.

371. Have you prepared any suggestions to place before the Committee?—Yes, I have a few suggestions to make, and I should like to see them adopted.

372. (*Mr. Greaves.*) Are your quarries underground quarries?—Yes.

373. How many men do you employ there?—I have only a few men there at present, but I have employed about 70.

374. And how many have you there at present?—I have only a few there just now. I am forming a company at the present time. With regard to the best means of securing the safety of the workmen in the slate-mining district of Merionethshire, I would make the following suggestions:—

(*a.*) That all managers and sub-agents in charge of employees should undergo an examination as to their ability to undertake the management of labour, in all its branches, in a practical manner.

(*b.*) That managers should visit all workings daily, and keep a record of each day's proceedings as regards the safety of the bargains, and of the other places at which men are employed.

(*c.*) That in putting up "rises" and opening up new places, as well as widening out the same, before the rockmen are engaged, all dangers should be removed and the roof well examined as to joints or slips. These, unless properly looked after, very often become a source of danger to the safety and life of the workmen.

(*d.*) That the men should not be entrusted with work, under any circumstances, unless they have already been accustomed to the same kind of work.

(*e.*) That no man should be allowed to use explosives without having had six months' experience under a practical man.

(*f.*) That all workmen who remove from place to place in search of work should invariably apply to the manager they have been working under for a written statement as to their knowledge and capability.

If these suggestions were adopted they would, in my opinion, be the means of preventing accidents to a very great extent, and they would also prove valuable, in any case of inquiry, in finding out who is to be blamed and held responsible for any accidents that may take place.

375. (*Chairman.*) Is there anything else that you could suggest?—There are a good many things that one might mention. I should think that all men in charge of labour should be capable of looking into all these matters, as we heard from the last witness. In many cases which I might mention, men were killed simply owing to the neglect of the management or of some official in the place, or for the want of some fully qualified man to superintend the work.

376. Are you now referring to underground slate quarries?—Yes, certainly.

377. (*Mr. Greaves.*) You say that accidents have happened owing to the want of some man in the place?—They were killed simply because nothing was done towards the safety of the men. For instance, when you are widening a bargain, a piece of rock often gets loose which is not attended to.

378. Have any such cases come under your own notice?—Yes, at the Gloddfa-ganol here, there was a man killed at my feet.

379. When was that?—About 30 years ago.

380. (*Mr Jenkins.*) Would you put the responsibility upon the employers of looking after those things and seeing that they are kept in proper condition?—Yes, certainly. What else ought he to do but look after the safety of the men he employs.

381. (*Mr. Greaves.*) It is done in many mines?—Yes, it is.

382. (*Chairman.*) Do you think that things have improved since you were working here 30 years ago?—Yes, they have improved. There is no doubt about that. I remember the time when there were no rules at all at these quarries.

383. (*Mr. Greaves.*) You are speaking of the state of things 30 years ago and not of the present state of things?—They are certainly much better now than they were 30 years ago, but there is yet room for much improvement.

384. Have you any experience at all as to the existing state of things in the Festiniog quarries?—Yes, I have.

385. You can speak from experience?—Yes, I can.

386. You have not been connected with these slate quarries lately have you?—Yes, I have a quarry close by at the present time.

387. What is the name of the quarry?—You will hear of it in a few days. I am going to work it shortly.

388. But what is the name of it?—It is close to Foelgron.

389. (*Mr. Jones.*) The Croes-y-ddwy-afon?—Yes. *Mr. T. Evans.*

390. (*Mr. Greaves.*) Is it an underground quarry?—Yes, but it has not yet been started. 5 Dec. 1893.

391. It is an underground quarry, but has not been started?—It has not been restarted. I am about to do so in a short time.

392. (*Mr. Evans.*) Can you refer to anything in the Festiniog quarries now which has come under your notice and which is not as it ought to be, or in any of the slate mines elsewhere, in the county?—I have already stated what improvements I think should be brought about.

393. (*Chairman.*) And those are the main things that you wish to put before us?—Yes.

394. (*Mr. Jenkins.*) What is your experience of the workmen; have they a tendency to become negligent if left to themselves?—If you had been accustomed to work the same as I have been, you would have found that men would do almost anything for the sake of making wages.

395. Then your experience is that men will do anything to earn wages?—Yes, and that is why I want to insist upon the employers being compelled to look after them.

396. (*Mr. Evans.*) Can you refer to anything further in the existing state of affairs at the Festiniog slate quarries or in the quarries in the Corris or Corwen districts which requires attention?—I have nothing further to say.

Mr. Richard Owen, Tanyclogwyn Terrace, Blaenau, Festiniog, examined. *Mr. R. Owen.*

397. (*Chairman.*) What is your occupation?—I have worked for 28 years in the quarry, and have been employed as labourer, miner, and rockman.

398. Are you a rockman at the present time?—I have been "untopping" now for some time.

399. (*Mr. Jenkins.*) Do you mean that you are engaged in removing the dangerous parts of the workings?—Yes.

400. (*Chairman.*) In which quarry do you work?—The Votty and Bowydd.

401. What are you employed in removing from the tops of the bargains?—I am removing what is loose over the 9-inch.

402. You mean underground?—Yes.

403. Have you any suggestions you can make to us with the view to ensuring the safety of the men?—Yes, I have a few suggestions.

404. Will you kindly let us know what they are?—The best thing I can think of at present is, that the rules which are in force now should be adhered to as closely as possible, and that as little as possible in the way of new rules should be added to them. There is one thing I should like to suggest with regard to the giving out of stores. I consider that the present mode of giving out the stores endangers the health of the men to a very great extent. It also leads to a good deal of inconvenience, and loss to the men.

405. (*Chairman.*) What stores do you refer to?—Powder.

406. Powder only, or do you refer to other stores as well?—It is the supply of powder that is restricted. You can get plenty of candles and other things.

407. In what quantities do you get the powder now?—4 lbs. at a time.

408. And would you prefer to get it in 25-lb. casks?—Yes, and I believe that mode would be quite as free from danger as the present mode.

409. (*Mr. Jenkins.*) Are you under special rules at the Votty and Bowydd, at the present time?—Yes, we are under certain rules.

410. (*Chairman.*) Have you any other suggestion to make?—I work a good deal at night, and as I only get 4 lbs. of powder at a time, I have to go from home in the daytime for it, and taken it underground, for which I receive no payment. Very often that quantity of powder is not sufficient for the work we have to do in the night, and we have to leave what is dangerous over the heads of the men for the following day, simply because we have not enough powder to take it down.

411. Why do not you take two canisters down with you, instead of one?—We are not permitted to get two canisters at a time, and in addition to that, there would not perhaps be a convenient place to keep them.

412. (*Mr. Evans.*) Where would you keep the 25 lbs. if you were allowed to take that quantity down?—I would try to make a safe place for it. 4 lbs. of powder is quite enough to kill any man, and if we consider the accidents that have happened one will find that the fatal accidents from powder are caused, as a rule, by small quantities rather than large.

413. (*Chairman.*) That relates to explosives for which special provision has been made by Act of Parliament; have you any other suggestion to make?—I do not know that there is anything more, but I should like to say that the present mode of giving out the powder leads to the loss by some bargain-takers of as many as five stems in a month. They lose that time through having to go for it so often, and that is in consequence of the small quantity allowed at a time.

414. (*Mr. Jenkins.*) Is it your experience that this rule as to the 4 lbs. is altogether impracticable?—It is practicable, but I think it is a very troublesome rule.

415. (*Mr. Evans.*) Could you not get double that quantity if you had any special need, and made application for it?—We cannot get it unless there is a place to use it directly.

416. (*Mr. Jones.*) How many canisters of 4 lbs. can you get together?—Only one.

417. And how many times a day do you get that?—I do not know that it is to be got more than once a day. I do not know that it is to be got in special circumstances.

418. So that there are only facilities for getting powder once a day, and 4 lbs. is what you get each time?—Yes, that is all.

419. (*Mr. Jenkins.*) Would you be satisfied if you were placed under the same special rules as the Oakeley quarries and the Llechwedd Quarry?—I am not prepared to express an opinion on that point, but it would be better for the men to be under rules which would be more convenient.

420. (*Chairman.*) Are you aware that in several quarries in the district the men are allowed to take down, and do take down, powder in 25-lb. kegs?—There is no permission for that.

421. Do you know that it is done in some quarries?—No, I do not.

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422. In some quarries permission is given and the men get it in kegs of 25 lbs. at a time?—Then there is no such permission given at our quarry.

423. (*Mr. Jenkins.*) Were you asked by the men to give evidence on their behalf at this inquiry?—Yes, I was selected by the men for the purpose.

424. You say that your work is to clear away the dangerous parts of the rock?—Yes.

425. What is your experience on that point; can you suggest anything with the view to preventing those places from becoming dangerous?—No, I cannot.

426. Is the Votty and Bowydd Quarry a dangerous quarry; is it generally considered so?—No, I do not think it is. It is very free from fatal accidents caused by falls from overhead.

427. Is there any undue cutting of pillars at that quarry?—I am not aware that there is, but that is according to the nature of the rock.

428. In order to make it less dangerous?—Yes, certainly.

429. It is not done with the object of getting the slates?—No, I do not understand that that is done so as to make a place dangerous.

430. What kind of tops are there?—The usual kind.

431. Are you working under the clay-slant?—Yes.

432. Do they unroof under the clay-slant?—Yes, in some cases.

433. In such cases is the 9-inch taken away?—The 9-inch is taken away before we go there. The miners remove the 9-inch as they go along.

434. That is always done?—Yes.

435. Is there any thickness above the clay-slant removed?—The practice as to that differs. In some parts it is being removed.

436. You say you have been a rockman?—Yes.

437. What is your experience as a rockman; do the men generally make their place safe before leaving it, or do they sometimes leave it in an unsafe condition?—There are exceptions. There are instances of men who are not careful enough to make their bargains free from danger, but the rule is the other way.

438. And do those cases result in accidents?—I do not understand that they neglect their bargains to such an extent as that, but as is very often the case the men are not always as careful as they ought to be.

439. (*Mr. Jones.*) You mean that there is danger for the places they neglect to become unsafe?—Yes, that is so.

440. (*Mr. Jenkins.*) Is there any supervision exercised over the men in such cases as that?—My view of the matter is that where the manager lets me a bargain it is my duty to see that the rock is taken down in a proper manner and in such a way as to be free from danger.

441. And that it is left to your judgment as to the best mode of working it?—Yes. If a bargain is let to me for a month or two I am allowed to work it in my own way unless I do something wrong.

442. Something wrong in what way?—To pull the rock down in such a way as to cause loss to myself and the owners.

443. So there is no supervision that it shall be kept in a safe condition?—As I have already said, when a manager lets a bargain to me I am responsible for keeping the place in a safe condition, but if the manager came round and saw something unsafe or in an improper condition he would of course call my attention to it,

444. Do you mean coming round accidentally, or on his ordinary visits?—I mean his ordinary rounds. No one knows when to expect him.

445. (*Chairman.*) Is it not a fact that these ordinary rounds are made every day?—They are sometimes made every day, and sometimes oftener than that.

446. (*Mr. Evans.*) Before you leave the roof entirely is there any inspection made by anybody of that roof?—Yes, the manager inspects it as a rule.

447. (*Mr. Jenkins.*) Does that apply to any part of the pillar also?—Yes, if information is given.

448. (*Mr. Evans.*) Were you afraid to come here to give evidence to-day?—No, I was not afraid at all. I have been waiting about all day for the purpose of giving evidence.

449. Do you think that the men in general are afraid to give evidence?—No, I do not know that they are.

450. Do you think that they have cause to be afraid?—I am not prepared to answer for anyone except myself. As far as I am concerned, I am not afraid of telling the truth.

SECOND DAY.

Mr. J. Lloyd Jones.
6 Dec. 1893.

At the Cocoa Rooms, Blaenau, Festiniog, 6th December 1893.

PRESENT:

DR. C. LE NEVE FOSTER in the Chair.

MR. J. E. GREAVES, J.P.
MR. E. PARRY JONES, J.P.
MR. J. J. EVANS, F.G.S.
MR. JOHN JENKINS.

MR. JOHN LLOYD JONES, agent of the Votty and Bowydd Quarry.

451. (*Chairman.*) I believe you are the agent of the Votty and Bowydd quarry?—I am.

452. For how long have you been agent?—It will be over 12 years, but I was under-agent for about six years before that; and I was slate inspector and time-keeper before that. I have been in connexion with the quarry for over 20 years.

453. Have you any suggestions to make with the view to preventing the dangers to health, life, and limb, amongst the men?—There is the question of powder. I believe it would be better for the men if they were allowed to have powder in larger quantities.

454. You mean as it is done at the present time at the Oakeley and Llechwedd and Cwmorthin quarries?—Yes, as it is done at the Oakeley and Llechwedd quarries. I cannot say anything as to Cwmorthin.

455. That is to say, in the 25lb. kegs instead of the 4 lb. bugles?—Yes.

456. Have you any other suggestion to make?—No, not with reference to that, but I think it would be better to have uniformity in the special rules. As the men move about from one quarry to the other so often it would be a convenience to them to have the same special rules in force at all the quarries.

457. (*Mr. Greaves.*) Do you think it would be well to have the same rules as Llechwedd?—Yes, but as to Rule 62, I do not understand it in the same way as Dr. Foster does.

458. (*Chairman.*) Are you not at the present time under the old special rules formed by my predecessor?—Yes, but that has nothing to do with giving the powder to the men in larger quantities.

459. (*Mr. Jenkins.*) Did you object to those rules being applied to your quarry when they were put up at the Oakeley and Llechwedd quarries?—We have asked for those rules.

460. (*Mr. Greaves.*) You have asked to be placed under the same rules?—Yes, we have.

461. (*Chairman.*) Have you ever sent in formal application for them after posting them up?—We printed them after speaking to you about them, but I think it was only a verbal arrangement.

462. It was not a written application?—You were at the office with us, but you refused to let us have them.

463. I did not refuse, because I had no right to do so?—We said that we would be very willing to go under those rules after getting your explanation.

464. (*Mr. Jones.*) What was the answer you got?—Dr. Foster wanted us to go under another.

465. (*Chairman.*) The answer I gave you was that if you altered your special rules it would be better to adopt the code of rules adopted at Cwmorthin, having precisely the same powder rules as Oakeley's, but containing some additional rules thought advisable, and that if you objected to these rules you could put the matter before an arbitrator, to be decided by him?—We did not want to be removed from being under the rules which were arranged by Mr. Evans, but we would like, for the sake of the rule as to powder, to be put under those rules, so that all the quarries should have precisely the same rules.

466. (*Mr. Jenkins.*) Have you any objection to any of the other rules in the special rules?—No.

467. (*Mr. Evans.*) Do you think that the quantity of powder given out affects the health, or life, or limb of the workman in any way?—I cannot say that it affects his life, but it does affect his health. The man has to come above-ground once, and sometimes twice, a day from the warmth down below, and I consider that it endangers his life, or at all events his health, in that way. A cask is easier for the men to carry, and it is also safer. This is an important matter, seeing that they have to walk a mile, or a mile and a half for it, and that they sometimes have to do that once or twice a day.

468. I suppose you can find a safe place to keep 25 lbs. of powder, just as you can to keep 4 lbs.?—Yes, certainly.

469. (*Mr. Jones.*) You could make as safe a place as they do at the Oakeley and Llechwedd quarries?—Quite so.

470. Supposing you got the powder in kegs of 25 lbs., but made up in small bags of 4 lbs each in the keg, would that facilitate your work and do away with the danger of sub-dividing the 25 lbs.?—That would make no difference if we were allowed to take it under-ground to the men.

471. But supposing you got it packed up from the makers in 4 lb. lots in the keg of 25 lbs., would not that be the very thing that you want; you would open your cask, and take out a bag, and put it in your bugle as you wanted it?—I have no objection to that at all. We get it in that way now, but as the rule stands at the present time we are not allowed to carry it under-ground.

472. (*Chairman.*) Not in the bag.—Not more than 4 lbs.

473. Not more than 4 lbs. in one package.—Not for one man either.

474. But one man can carry the quantity he wants.—No, not at present.

475. If he wants two bugles he can take them.—But you cannot store it.

476. No, not underground.—No, so that we are not a bit better off.

477. (*Mr. Greaves.*) But if you adopt these rules you get what you want?—Yes, quite so.

478. (*Mr. Evans.*) Would you propose that the Cwmorthin, and all the other quarries, should be under one code of special rules?—Yes, I should, most certainly.

479. (*Mr. Jenkins.*) Do you not think that the mode suggested by Mr. Jones just now of carrying the powder in a 25 lbs. keg, but divided into small parcels of 4 lbs. each, would be safer than the system at present in force at the Oakeley and Llechwedd quarries, that is, carrying the 25 lbs. keg without opening it?—It would be an improvement to have it in small bags in the keg, because in that case you would not have to remove all the keg from the chest.

480. But you would have to keep the keg in the chest, and leave it open?—Yes.

481. Whereas in the Oakeley and Llechwedd quarries they keep it in a cask, with a small hole in it?—Yes.

482. (*Chairman.*) What do you object to in the Cwmorthin special rules?—I have not got them now, but I did object at the office.

483. You have the remedy in your own hands, and you can have no difficulty at all. There is no reason why you should not have precisely the same facilities that they have at Oakeley, and at Llechwedd, and at Cwmorthin, and that they had at Aberllefenny as well.—If that is so there is an end of it, as far as we are concerned.

484. The Act of Parliament was specially passed for that purpose, and there is no reason why you should not have the advantage of it like other people, but you must go through the proper routine required by the Act.—We have been given to understand by you that if we make the application we will not get it.

485. There will be no difficulty at all about it.—I am glad to hear that.

486. Have you any other suggestion to offer?—I am not aware.

487. One class of accidents that is not uncommon is the fall of rock from the roof of a chamber, or from the side of a pillar, from places beyond the control of the workmen. How can these accidents best be prevented, in your opinion?—I do not know of anything better than to carry out the Act, which requires the proprietors and managers and workmen to adhere to the rules. I think it would be a great mistake to remove the responsibility from the shoulders of the men. Men who have worked for six or seven years in the same chambers are the most practical men in matters of that kind.

488. Take this case, a new chamber is begun, a "roof" is put up, a chamber is widened; do the miners who do the work carefully sound the roof and leave it in a safe and sound condition?—We do that always. After the miner has finished his piece-work we go there to inspect it, and we tell every bargain-taker that he is to see that the roof is safe.

489. Of course the man can see that the roof is safe when he takes the bargain, but he goes on working for four, or seven, or ten years, say, under the same roof, and as he proceeds he gets further and further away from the roof, and in time the roof is out of his reach, unless he employs, or somebody else employs, the long ladders. How can the workman in his bargain protect himself from falls of the roof or the sides?—No one can say whether it is safe or unsafe without the aid of a ladder to go up to the top of the chamber.

490. (*Mr. Greaves.*) Have you any special mode of examining the roof?—Yes, we have.

491. What is the nature of it?—We have a very big lamp, and at other times we put paraffin oil on cotton waste at the end of a rod, and add rod to rod until it is long enough, and then we move it backwards and forwards to examine the roof, and if we think it necessary after that we employ ladders.

492. Does not that cotton waste create a good deal of smoke, and in that way defeat the very object of the inspection?—We begin at the top, and work downwards, so that the smoke is left behind. I think that is better than the Wells lamp.

493. (*Mr. Jenkins.*) You believe that paraffin is better than the Wells lamp?—I think it is better on cotton waste than in the lamp.

494. (*Mr. Evans.*) How often do you make these examinations of the roofs and sides of the pillars?—Where we think there is any danger from "bevels" we make an inspection very often, but we do not make an examination often where we know the hard is quite safe.

495. You do not do it periodically, monthly, or quarterly?—No, we do not. We pay all the attention to the bad places.

496. How often do you pay that attention to the bad places?—We have men at it every day in one part of the quarry or other.

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497. (*Chairman.*) In different parts of the quarry?—Yes.

498. (*Mr. Evans.*) I suppose some of the accidents at your quarry have happened through things falling from your roofs?—There has been one accident from that cause in 15 years.

499. (*Mr. Jones.*) Were there not two accidents from that cause?—No. The other which you are referring to, was from something else, I think.

500. (*Mr. Evans.*) Have any of the accidents been caused by falls from the sides of the pillars?—No, I do not remember any.

501. How did the two accidents happen that are entered under the head "falls of ground," between 1885 and 1892?—I do not know which are the accidents referred to without the names, but if you can give me the name of the man I can perhaps tell you.

502. (*Chairman.*) One was on the 19th March 1884, Richard Thomas, miner. He was standing on a ledge of rock which he knew to be insecure, and it gave way, and he was killed. Do you remember that?—That was a fall, and he was standing on the top of it.

503. The other case was on the 5th April 1889. Robert Thomas, labourer, "unexpected fall of part of roof in an old chamber in which he was working." About two tons of rock fell a short distance from him; you remember the case?—Yes; that is the only one that has happened in that way.

504. (*Mr. Evans.*) Do you think it would have been possible to prevent one of those accidents?—One of them might have been prevented if the miner had used the chain. He had the chain on the rock beside him, but he did not use it.

505. Do you think the men are too careless of themselves in matters of that kind?—Yes, some of them are at times. There is no doubt that if they exercised more care there would be fewer accidents.

506. Do the officials warn them sometimes about that?—Yes, they do, and they often fine them as well.

507. Do you know of any non-fatal accidents which occurred through falls of ground during the period I have referred to?—I do not know of any which happened owing to falls from the top or from the pillars, but I know of some from the face of the rock.

508. And do you think that many of those were accidents that could have been prevented?—The men are often too reckless in many things, but the injuries they receive are looked upon as the results of accidents.

509. Do you know of any of those accidents that have happened in consequence of the officials not exercising sufficient care in looking after these places?—No, I do not know of any.

510. (*Mr. Greaves.*) We had some evidence placed before us yesterday; do you know whether or not it is the custom of the managers of the Festiniog quarries to let work on contract, to be carried out in a manner which they know to be dangerous, in order to have it carried out cheaper than would otherwise be the case?—I have never heard of that, and no manager ever did it with me, and I have been working for 23 years.

511. Are the rockmen as a rule taken on to the rock from the waggons without any former experience?—They are taken on from the waggons mostly, but they are taken to do something on the rock first of all. Those men are not equal to the slate quarriers. The best workmen are those who come to that work first of all, before commencing at anything else, but the Factory Acts do not allow you to take them under ground very young.

512. (*Chairman.*) By the term "slate quarrier" you understand a man or boy who works in the sheds?—Yes.

513. In ordinary talk by the term "quarrier" would be understood a man who was getting rock or quarrying rock?—Yes, quite so. I mean that the slatemaker is the best man.

514. (*Mr. Greaves.*) Are any men ever put on the rock without your consent?—No, never. We always see that they are responsible men.

515. You always do that?—Yes. They come to me to ask for permission to put them, and when I was working we were never allowed to put a man on without asking the manager.

516. How frequently are the bargains visited by the managers?—I cannot tell that.

517. Would they be visited once a day?—No, the manager would not visit every bargain daily, but some of the sub-agents would.

518. Then either the manager or a sub-agent would?—Yes, once a day.

519. So that every working place in the quarry is visited by an official every day?—Yes.

520. (*Mr. Evans.*) Does the official when he comes on his round take special notice of the state of the rock; does he see whether it is safe or not?—I cannot say that he does that, but he goes to see the bargains.

521. Have the men an opportunity of mentioning the matter to the agent if there is anything wrong?—Yes, we tell them that when we let the bargains to them.

522. But have the men an opportunity of telling the agents?—Yes, and we compel them to tell the agents if they think there is anything wrong.

523. From that I gather that you find the men are inclined to keep from you the fact that the places are not safe, and that they do that with an object?—Perhaps some of them do, but the bulk of the men are otherwise. There are so many different kinds of people among 400 workmen.

524. (*Mr. Greaves.*) The bulk of the men state at once if there is anything wrong?—Yes, they do, at once.

525. (*Mr. Jenkins.*) You say you have worked for 23 years?—Yes.

526. Were you working above-ground or underground?—Both.

527. Therefore you took bargains underground?—Yes.

528. Were you working as a rockman or as a miner?—As a rockman.

529. Therefore you do not know how the miners take their work?—Yes, I know; I know how they take it now, and how I let it.

530. Can you say of your own knowledge that the bargains are not let in such a manner to the miners that they are put under the temptation of doing a great deal of work and therefore of not doing it properly?—Take as an instance the case of a man who has the "unroofing" let to him, and instead of taking away the 9-inch, it is propped up in order that it may all come down together; have you seen instances of that?—No, never. We always let the "9-inch" with the other.

531. Has it ever been done as far as you know?—I never heard of the "9-inch" being treated differently to the other.

532. But it does not come off with the other, does it?—After we get the free side it is cheaper to pull it down.

533. Where they unroof a chamber is it, as a rule, rather flat?—It is more flat than in the case of the Oakeley quarries.

534. (*Mr. Jones.*) What is the angle?—About 30°.

535. Do you consider that the average?—Yes.

536. Do you mean the cleavage or the slant?—I mean the cleavage.

537. What about the clay-slant?—It is about 23°.

538. (*Mr. Jenkins.*) They have a certain amount of trouble in removing the rubbish?—No. We give them 10 yards to clear in one chamber and then remove them to another, so that there will be no trouble.

539. And then you put rockmen to work the rock?—Yes.

540. Have you known of any accidents with the other mode of working bargains, opening it altogether in one chamber and then beginning to work the rock?—I remember they used to do that at the Welsh Slate Quarry years ago, but I have never seen it anywhere else.

541. Under certain circumstances it might be a temptation to the miners to leave the 9-inch in order that they might be saved the trouble of removing the rubbish?—We examine it every month, and if a man has not cleared it, we hold some money back or stop him from working.

542. Then you keep a careful supervision over the miners so as not to allow it to accumulate?—Yes, and we tell the bargain-taker who is to work there after the

miner that if he sees anything dangerous he is to report it, so that there will be no ill-feeling between the rockmen and the miners.

543. (*Mr. Jones.*) As a matter of fact you let the 9-inch together with the other portion that the miners have to take away?—Yes.

544. And you make no difference in the price?—No, none at all.

545. (*Mr. Jenkins.*) Is there any other thickness above that which tends to loosen itself?—Sometimes the bed is hard, but it is not always so, and we have to see to it carefully.

546. (*Mr. Jones.*) What is your usual custom, taking the quarry generally; do you open under the clay-slant or under the igneous rock?—Under the igneous rock, as a rule.

547. So the "9-inch" is below you then?—It is taken down.

548. (*Mr. Jenkins.*) You stated that one of the accidents referred to occurred owing to the ground giving way under the man's feet?—Yes.

549. Was he a miner?—Yes.

550. He was not actually taking away that rock?—No, he was opening.

551. Did he know that the place was dangerous?—Yes, the man had told him of it some time before that. They had warned him of the danger.

552. What sort of a place was it?—The man was widening the chamber, and he had blasted one hole and was boring another. The men told him that the first hole which he had blasted had loosened the rock, and that there was danger of it coming down, but he took no notice of their warning and persisted in going on.

553. That chamber had been for some time worked by the rockman?—Yes.

554. So as to make a free bottom there?—I am afraid you do not follow me.

555. The chamber had been worked for some time so as to make a free bottom?—No, it was not that. They were widening the chamber. The side of the chamber had been opened before, and we were making the opening wider.

556. Could anyone have known before that day that it was becoming loose?—It had not been loose for an hour, or for 10 minutes even.

557. (*Mr. Greaves.*) It was immediately after the first blast, you say?—Yes.

558. (*Mr. Evans.*) He was going to fire a blast, and not to bore a hole?—Yes. He had bored three or four holes, and he went there to blast a second hole after blasting the first.

559. (*Mr. Jenkins.*) Are the men, for some reason or other, sometimes apt to leave rock which is loose on the sides of the pillars; what is your experience as to that?—It is certain that one man is not as good as another in that respect.

560. Is there a difference in the way of cutting the pillar?—Yes, a good deal.

561. Some cut it in such a manner as to make the pillar loosen?—No, they do not do that. We see to that.

562. How do you do it—you say you go round and inspect it every day; how do you make that inspection?—Every experienced man will know from the bottom of the chamber whether a man cuts his pillar too much.

563. Can he say whether there is any loosening of the pillar?—If we suspect that we go up to the rock to see.

564. Do you believe there is no responsibility beyond that resting upon the manager or agent?—The men are too venturesome in many ways, but you cannot call those things anything else but accidents.

565. Do you consider that all the sides should be left in a safe condition before they go beyond reach—the sides and the tops?—They all try to do that.

566. Do they, as a fact, try the places themselves with a hammer?—Yes, they do frequently, hundreds of times in a year.

567. Do you consider that in the case of every chamber, before it goes out of the reach of the workmen the manager should go to see that it is left in a safe condition?—There are about 60 bargains in the quarry, and no man can go to see to all those bargains at the same time.

568. (*Mr. Evans.*) But do the managers see to that before the rocks are taken away, so that it cannot be tested easily?—When there is a level we go and examine it ourselves, or the sub-manager does so, or we tell the man who is to see to those things to go there to examine it.

569. (*Chairman.*) Is not that one of the rules to carry out? Is there not a rule which says that the agents shall see that the roof is left in a safe condition by the miners before any slate is allowed to be worked underneath?—Yes, I believe I have given an answer to that effect already.

570. But that is one of the rules you have in force at present?—Yes, it is.

571. (*Mr. Greaves.*) And any pillar that shows signs of giving way, he is to see to that as well, according to the rules?—Yes, he is.

572. (*Mr. Jones.*) Is it your experience that you can detect all danger with the hammer? Supposing you go to the roof with the hammer, can you detect all possible dangers with it?—No, I do not consider that you can. When the piece is very large it is not possible to sound it with the hammer.

573. (*Mr. Evans.*) And where there is a large area?—Yes, quite so.

574. (*Mr. Jones.*) Have you, in your experience, seen cases where the chambers have been examined and there have been falls shortly afterwards?—Yes. We had been examining the place where the rock fell upon Robert Thomas, and we thought it was one of the safest places in the quarry.

575. (*Chairman.*) Had you examined it with the hammer?—Yes. I may say with regard to what was said a few minutes ago that if I knew that a man did anything improper I would stop him from working at once.

576. (*Mr. Jenkins.*) You take no special care to see that they do not do anything improper?—Yes, we do.

577. (*Chairman.*) With regard to the paths for entering the quarry, do you think it advisable, as far as possible, that the pathway for the men should not be on the incline?—Yes, and we do that as far as we possibly can. We make holes on the first incline.

578. Have you within the last few years put in pathways separate from the incline?—Yes, we have.

579. (*Mr. Evans.*) You consider that there should be paths to the quarries quite clear of any machinery or of waggons passing along?—Yes. We have a notice on the incline about that.

580. But as a general rule, do you think there should be a separate path for the men to enter and leave the quarry which is quite clear of waggons?—Yes, it is very necessary wherever it can be done.

581. (*Mr. Greaves.*) And what means would you adopt in cases where that cannot be done?—In the lower floor you have only the incline to go along.

582. Do you cut refuges at a distance of a few yards from each other?—Yes, we do, and we cut them much nearer to each other than we are bound to do according to the Act of Parliament.

583. (*Mr. Jenkins.*) Do you work your quarry in such a way that there is always an open top to every chamber to another floor?—We have some with a "ceiling-bôn," but none without ventilation.

584. Is there any way for the men to go from the bottom after an explosion without going into the face of it? Are there two ways for a man to go, one up and one down?—If we have a "ceiling-bôn" we make a man-hole for the men to go to.

585. That is always done?—Yes, but it is very little "ceiling-bôn" that we have.

586. (*Mr. Jones.*) Do you find that the refuges you make in the incline are of any practical use; are they of any real use to the men if anything happens on the incline?—Yes, they are useful. If a man is going down and a waggon starts up he can turn to the man-hole, and as something may happen to the waggon before it arrives at the top of the incline, he is not to leave the man-hole until it reaches the top.

587. Then the man-holes are to be used when the waggons are working?—Yes.

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588. What would be the result if an accident happened when the man is not in the refuge?—He would not have time to run into a man-hole unless he happened to be very near to it.

589. (*Mr. Evans.*) Do you think that the men should not be allowed to travel on the incline when there is a waggon on it?—Yes, I do, and we have a notice up as to that.

590. (*Mr. Greaves.*) Has there ever been any accident on your incline, as far as you are aware?—We had an accident on the new incline when a waggon was going down.

591. But that was not the case of a man passing up or down?—No.

592. (*Mr. Evans.*) Do you provide stops on the top of the incline that are certain to keep the waggons from running over?—Yes, we do at night, but we do not put them there when the men are working, as they would be in the way, and they are not required at all.

593. But you have something there when the men are at work to stop the waggon at a certain point?—No, we have nothing at all there.

594. (*Mr. Greaves.*) But at the top of the incline the gradient is the other way?—Yes.

595. (*Mr. Evans.*) Do not you think that there should be something to stop the waggons?—No; the gradient is away from the top of the incline, and no waggon can go over the incline unless it is pushed over.

596. (*Mr. Jenkins.*) Have you ever had an accident on the incline because the men have not had a place to shelter?—No, we have not, except the one I have already referred to.

597. Was there a place for them to shelter there?—Yes, there were two levels further on.

598. (*Mr. Evans.*) You have had four fatal accidents underground which are described as having happened from "miscellaneous causes;" can you give us a description of these and say how they occurred, and whether they were due to carelessness on the part of the men or agents?—I daresay I can, if you can give me the names of the men.

599. (*Chairman.*) One was in 1889, Daniel Roberts, miner. He got over a fence and fell over a precipice of 50 yards; you remember the case?—Yes. That was through carelessness on the part of the man. He disobeyed one of the rules.

600. (*Mr. Jenkins.*) What was the rule that he disobeyed?—He went over the fence.

601. Was there a fence there?—Yes, there was a fence 3 feet high. There was a bar there and a wall.

602. Where was he going from at the time?—He got over the fence at the entrance to a disused level and fell over a precipice 50 feet deep at the other end of the level. He had no business there.

603. Where had he been before he went there?—I cannot say where he had been.

604. Had he any powder with him at the time?—Yes.

605. And where did you find the powder when the man was discovered?—It was at the bottom with him. It is believed he went there to relieve his bowels.

606. Is it likely that he would have taken powder with him if he went there for the purpose of relieving his bowels?—There is no doubt he took the powder with him.

607. Was the fence put there before the accident, or afterwards: when was it put up?—It was there before the accident and it was there after the accident.

608. (*Mr. Evans.*) You say that the accident happened because the man went out of the proper way?—Yes, quite so.

609. (*Mr. Jenkins.*) Was he an old workman in the quarry; had he been there for years?—Yes, he had worked there for years, and he had been working there on a previous occasion for years.

610. Had he been there for some years that time?—No. I do not think he had that time.

611. (*Mr. Evans.*) What about the other three accidents from "miscellaneous causes"?—Those were the men who were killed in the pass-by.

612. A waggon came down and killed three men at the same time?—Yes. There was a man to be at the bottom, but he was not there at the time. I think one of the cotterels broke.

613. Were the same men there as usual doing their work at the top of the incline?—Yes, one of them was there, and the other had only just come there.

614. And he had no business there?—Yes, he had business there with the waggons.

615. Was it his business to put the waggons over?—The other man put the waggons over at the top.

616. (*Mr. Greaves.*) You think one of the links broke?—Yes, I believe so.

617. (*Mr. Evans.*) Do you make a periodical examination of your machinery?—Yes.

618. How often do you examine them?—We examine some of them every day. We have a man to look after these things, and to repair anything that wants repairing. The men who are at the top of the incline see to that as well.

619. Does the man you refer to keep a record of any defects he may find in the machinery?—I stop them at once if there is anything wrong.

620. But does he keep a record of the defects in any memorandum book?—No, he does not, but he stops the waggons from being used, and the men on the incline do the same thing when they find anything wrong.

621. Do not you think it would be very desirable, when any important defect is found, that a record of it should be entered in a book, and that the repairs should at once be seen to?—I do not think that would be as good as our present system.

622. What objection have you to that plan?—A man might say in a report that he had been to examine certain machinery, whilst he had perhaps not seen it at all; but as things are at present he is bound to attend to it.

623. But if you get an honest man, who does his work, he would enter it exactly as he found it, would he not?—Yes, an honest man would, there is no doubt.

624. And you would appoint a man in whom you could place confidence?—Yes; we can place confidence in them all.

625. And you do not think it would be a good thing to have these entries made in a book—entries of the defects as well as the repairs?—I do not think it would be of any advantage.

626. Do not you think that if that were done, and that anything happened to the machinery afterwards, it would relieve you to some extent of responsibility, by showing that you had done your duty in the matter?—We are doing our duty by compelling the men to inspect them, and to stop every waggon that is not all right. It is no benefit to them to allow waggons to be used if they are in any way defective.

627. But these things do happen sometimes, do they not?—Yes, they do; and accidents will always happen.

628. (*Chairman.*) With regard to the sanitary arrangements, what conveniences have the men at your quarry in that way?—In some places there are openings for them to go to, and in some places we cut tunnels for them.

629. Are those open to daylight?—Yes, they are, and they are well-ventilated too.

630. Does it interfere in any way with any of the working places where the men are employed?—No; we fine them for going to the working places, and tell them to go to parts of the quarry which are worked out.

631. And the worked-out part is largely used by the men?—Yes.

632. And is it open to daylight?—Yes.

633. Is it near the top?—Yes.

634. Does it in any way affect the air that the men have to breathe in other parts of the quarry?—No, it does not; there is plenty of air there. It does not pass through the part that they work in.

635. (*Mr. Greaves.*) You have privies outside, I suppose?—Yes, we have in some places.

636. Have you them on every floor?—No, not on every floor.

637. How many have you altogether?—There are four or five in the middle floor, but I cannot say exactly.

638. And do the men use them?—Sometimes.

639. Have you any difficulty in getting them to use them?—Yes. They do not care to go from one floor to the other.

640. (*Mr. Evans.*) You say you have not got them on every floor?—No, we have not.

641. Do the men who are on the floors where privies are provided object to use them?—Yes, they do, quite as much as the men who work on the floors where there are no privies.

642. So that the men object to use them apart from the question of convenience?—Yes.

643. Do you clean these privies sometimes?—The water runs through them to the big troughs.

644. But that is not the case with regard to the openings below?—No.

645. (*Mr. Jenkins.*) There are no facilities except the open places?—No.

646. (*Mr. Greaves.*) Does any nuisance arise from these open places?—No, none whatever.

647. (*Mr. Jenkins.*) Is there any disagreeable smell arising from them?—No.

648. And are these open places convenient for the men?—Yes, they are very convenient.

649. What about the water that the men have to drink at the quarry, is it pure?—I had a doctor from London to see it, and he said it was the purest water he had ever seen in the world.

650. Was that water above-ground or underground?—It was underground.

651. (*Mr. Evans.*) The water as it oozes out of the rock must be pure, but after it runs for some distance along the quarry do the men drink it then?—No; it drops down into the road and gets very dirty afterwards.

652. So that the men cannot drink it except where it oozes from the rock?—Yes, that is all.

653. (*Chairman.*) Do the men drink much water?—No, not much, but they do drink sometimes.

654. (*Mr. Jones.*) What is the practice of the men in getting water for drinking purposes where it oozes from the rock?—They have cans or old jam pots and things of that kind.

655. (*Chairman.*) So that the men themselves collect it?—Yes.

656. (*Mr. Evans.*) How are the sheds at your quarry ventilated?—I think they are fairly well ventilated. In the middle we have 10 yards of walling, and at the end 5 yards.

657. Do you think that there is a great deal of dust in the sheds?—There is dust, but not to such an extent as to injure health.

658. Could you diminish the dust, do you think?—I do not think we could in any better way. Somebody suggested yesterday that the place should be watered, but I consider that utterly impracticable. The water would drop down on the men, and the dust would float up and stick to the ceiling and come down again in larger quantities after the water had dried away. The dust can go out through the walls at present.

659. Is that the only place where it can go out?—We have holes there in several places.

660. Do you not think that proper ventilation at the top of the sheds would help to remove the dust?—I do not think myself that it can be done.

661. Do you consider it would be an improvement or not?—I cannot give a very definite answer to that question. Some of the dust might be removed in that way, but in my opinion it would not do much good.

662. (*Mr. Jenkins.*) You say that it would be impracticable to water it?—Yes, I think so.

663. Would it be practicable, do you think, to have pipes running along the sheds?—That would also drop on to the men.

664. But you might fix the pipes at the bottom and have india-rubber hose to spray the water over the place?—I do not think you can do that either.

665. Is there much dust in the sheds in winter, as much as there is in the summer when the weather is hot and dry?—I think there is in the top, but perhaps it is not so at the bottom, because the place is very damp down below.

666. So you could keep the dust down by damping it?—Perhaps we could, but there is such a draught there that the dust always rises up, no matter what you do. If you water it as you suggest it only makes it worse when it dries again.

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667. (*Mr. Evans.*) Does the dust rise from the sawing and dressing machines?—Yes, that is where it comes from chiefly.

668. And it does not come so much from the floors?—No, not so much.

669. (*Mr. Greaves.*) You run your saws in water, do you not?—Yes, we do.

670. And when saws are run in water there is not very much dust created by them?—No, not very much, but there is some. I do not think that the dust would rise so high as the ventilators at the top.

671. (*Mr. Jones*) Do you think that less dust or more dust should rise from a machine than from a man using his hand in the ordinary way with a knife?—(*No answer.*)

672. If you cut a slate with one stroke, does that create more or less dust than a man would with an ordinary knife, with which he would make perhaps two or three small cuts?—It is very difficult to say. The space to be travelled is of course exactly the same.

673. If you use the water spray, would that tend to keep the dust in the mill by converting it into clay, or would it drive it out?—It would turn it into clay, I think.

674. (*Mr. Evans.*) Would it be as injurious to health if it were on the floor as it would be in the air?—Both are dust.

675. In a state of clay on the floor would it be injurious to health?—When it is dry and the blocks are taken from the table the very small grains of the clay would rise up to some extent, just as the dust does, though not perhaps to the same extent.

676. What about the question of ventilation; can you give the Committee any information as to how you deal with the ventilation of the places that the miners work in?—We are very good in that respect, I think, at our quarry.

677. Will you explain your way of doing it?—We drive the tunnel at one end, and sink down to meet it sometimes, and we "roof up" at other places.

678. You make the places as short as possible?—Yes.

679. (*Chairman.*) Do you not find that the ventilation when you sink down is better than the ventilation when you roof up?—Yes, we do.

680. (*Mr. Evans.*) Have you enough draught to take all the dust and smoke from the chambers?—Yes, I believe we have.

681. One of the witnesses yesterday, I think, hinted that a candle light is not quite sufficient to detect any danger that may exist in a chamber; what is your experience on that point?—I prefer candles to anything else to see to work the rock.

682. On the face of the rock?—Yes.

683. Then you think it is sufficient?—Yes, I always take a candle instead of a lamp myself to inspect the rock before letting it.

684. (*Mr. Jenkins.*) Is it sometimes darker there than at other times?—Yes, it is.

685. When is that the case?—When there is smoke there, and when it is very dry or very hot. When the atmosphere is very heavy outside the smoke does not lift so very well.

686. (*Mr. Greaves.*) When the pressure is large it keeps in the smoke?—Yes.

687. (*Mr. Jenkins.*) Is it during the greater part of the year very smoky?—It is very difficult for you to say. The cause of it is rather a puzzle.

688. (*Mr. Jones.*) It is the condition of the air outside, is it not?—Yes, that is it.

689. (*Mr. Jenkins.*) Do you ventilate these places by some other means than by keeping them as short as possible?—No, we do not do anything just now.

690. (*Chairman.*) You begin widening from above?—Yes. After cutting the 7 yards of roof we commence to make the place larger.

691. (*Mr. Jones.*) To make it an air receiver?—Yes.

Mr. J. Owen.

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Mr. JOHN OWEN, Newmarket Square, Blaenau Festiniog, examined.

692. (*Chairman.*) Where do you work?—At the Oakeley quarries.

693. And what do you do there?—I am a slate-maker.

694. What part of the Oakeley quarries do you work at?—The Middle Quarry.

695. How long have you been working as a slate-maker?—For 35 years.

696 You have worked above-ground the whole of that time?—Yes, as a slate-maker.

697. Have you worked underground at all?—No, I have not.

698. Have you any suggestions to make with the view to making your occupation more healthy or safer?—No, I have not.

699. Have you suffered from any illness at all as the result of your occupation?—I cannot refer to anything in particular.

700. Have you suffered in any way from inhaling dust?—No, I have not.

701. Do you, in your experience, know of any men who have suffered from the inhalation of slate dust?—I cannot refer to anyone in particular.

702. Do you consider that you have sufficient ventilation in the sheds?—There is air coming into the sheds from several places. It is a very convenient place to work in where I am.

703. Do you think the machinery at the quarries is sufficiently guarded or fenced?—I do not think there is any danger from the machinery where I am working; that is, the sawing and dressing machines.

704. Have you any other evidence that you would like to give?—No, but I will answer any questions.

705. (*Mr. Evans.*) Were you ever under the care of a medical man?—Yes, several times.

706. From what complaint did you suffer?—Indigestion.

707. And do you know what brought it on?—No, I do not. I am very subject to it always.

708. What are your meals generally?—Tea, mostly.

709. What do you take at breakfast?—Tea.

710. And what do you get with it?—A little meat.

711. You do get meat?—Yes.

712. Do you get meat every day in the week?—Yes, I do, a little.

713. What does your dinner consist of?—Tea.

714. And what else?—Bread and butter.

715. Do you get any meat with that meal?—Yes, a little meat or a little cheese, just as it happens to be.

716. Do you take anything else at the quarry after that meal, and before you get home?—No, I have made it a rule never to do so.

717. What do you get for dinner after you reach home?—Potatoes and meat.

718. Do you take tea with it?—No.

719. Do you take any supper after that?—Yes.

720. What do you get then?—Tea, as a general rule.

721. Did the doctor tell you that that mode of living was likely to bring on indigestion?—Yes, he has told me many times that drinking too much tea would bring it on.

722. Do you believe it?—Yes, I do, but it has become as second nature to me.

723. You do not think you could alter your way of living if you tried?—Yes, I could.

724. And you think you would live longer if you did so?—I cannot say anything about that.

725. You do not work in wet clothes, as you live close to the sheds, you never get wet?—No, except a little on my legs. I work in a dry place all day.

726. You live near the quarry, I suppose?—No, it is about three-quarters of a mile.

727. What kind of place have you at the quarry to take your meals in?—We have eating-houses, which have been made for the purpose.

728. Will you give us a description of the general character of these places?—It is a building with a stove in it to boil water, and there are three or four tables in it, with benches all round the place for the men to sit upon. We range ourselves in parties around these tables.

729. Do you stew your tea much before drinking it?—As the number of men is large, we put the tea in the kettle, and if it is there for half an hour before we drink it of course it stews a good deal.

730. (*Chairman.*) Do you often put it into the kettle half-an-hour before you want to use it?—No, not always.

731. But you do sometimes?—Yes, and sometimes it is only there for a quarter of an hour.

732. (*Mr. Greaves.*) How long before the dinner hour is the room open?—The water is put on the stove two hours before the time, and the place is open about three-quarters of an hour before dinner-time.

733. (*Mr. Evans.*) I suppose that many of the workmen come to the quarry from long distances, and get wet before they reach their work?—Yes, that is the case with many.

734. Is there any convenience for them to dry their clothes, or to get dry clothes to work in?—No, I do not know that there is.

735. Do you consider it would be very convenient if such a place were prepared for the men?—Of course it would be a great advantage for the men to have a place where they could dry their clothes when they get wet in the morning.

736. Is it within your knowledge that anyone has taken cold in consequence of getting wet in that way, or remaining at work in their wet clothes?—I cannot remember an instance of that kind.

737. (*Chairman.*) Have you any complaints to make about your mode of working?—No, I have nothing at all.

738. (*Mr. Jones.*) Do you know whether any wet clothes are left in the eating-rooms to dry?—No. We made a request for that to be allowed, but it was refused on the ground that it might be a source of danger to the health of the men.

739. How long do you boil the water before you put the tea into the kettle?—The water is put on the stove about 10 o'clock in the morning, or earlier than that sometimes.

740. But you do not know how long the water boils before you put the tea into it?—The time varies. It depends on the time the stove takes to heat.

741. (*Mr. Greaves.*) Are steps taken by the management to keep all the machinery of the mill in which you work in thorough working order?—Yes, that is done in the place where I work.

742. (*Mr. Jenkins.*) Do you consider that you get a good cup of tea at the quarry?—No, it is not very good.

743. And is that the general feeling?—Yes, it is.

744. Do you feel the dust to be very agreeable?—I do not know of anything that will do away with it.

745. Do you like to work in it?—There is not so much of it now as there used to be. When the vertical knives were in use there used to be a good deal of dust, but with the circular machine there is not so much.

746. Are the men in the mills sometimes to be seen white with dust?—No, except when the door is open and the wind blows the dust on to them.

747. (*Mr. Evans.*) I suppose there is a quantity of dust on the coats of the quarrymen when they leave off at the sheds; it colours their coats, does it not?—Yes, there is a certain quantity of dust from the slate that cannot be avoided. If a man gets his trousers wet, and he beats it after it dries, a good deal of dust will rise from it.

748. (*Mr. Jones.*) Have you been asked to come here to give evidence on behalf of somebody, or have you come of your own free will?—I was asked to give evidence as far as my experience would allow me.

749. Were you asked to come here to give evidence by the quarry proprietors or by the workmen?—I was asked by the manager.

750. (*Chairman.*) Did you offer the manager that you would come here to give evidence?—No, I did not, but I said I would give evidence after he asked me.

751. (*Mr. Evans.*) Do you think you represent anybody but yourself?—I cannot say.

752. (*Mr. Jenkins.*) Do you know the general feeling of your fellow workmen about the agreeableness or otherwise of dust to work in?—No, I do not. That is how we have always been working, and I have not thought of any means of doing away with the dust. There must of necessity be some little dust in working slates, but in my opinion there is not so much now as there used to be under the old system.

753. Is there, as a matter of fact, a good deal of dust in the mills still?—Yes, there is, especially in summer, and it is quite possible that there is much more than we can detect.

754. If Mr. G. J. Williams (the interpreter) were to go into the mill with black clothes and stay there for some hours would they be black when he left?—They would not be so black as they are now, perhaps.

755. (*Mr. Evans.*) Do you know of any accidents which have taken place in the quarry in which you work?—Yes, I know of them through seeing them.

756. Do you know how they were brought about?—No. Richard Jones, who is here with me to-day, knows more about them than I do, as he works underground.

757. Do you know of any accidents that have taken place above-ground?—There are sometimes slight accidents, such as where a man hurts his finger or a block falls upon his leg or foot. Accidents of that kind do sometimes occur in the mills.

758. Do you know of any serious accidents which have taken place which could, in some way, have been prevented?—I do not recollect now.

759. There have been two fatal accidents in the Oakeley quarries above-ground during the last eight years; can you tell us how those took place?—No, I cannot.

760. (*Chairman.*) One was in 1886 at the upper quarry, John Tudor Roberts, 69 years of age, fell over a natural precipice which was used as a tip; do you remember that?—Yes, I do.

761. And the other was on the 19th August 1892, Richard Roberts, labourer, who was working above-ground at the foot of the "fall" and a stone fell upon him; do you know anything about that?—No, I do not. Richard Jones, who is here as a witness to-day, worked close to him, and he will know all about it.

762. (*Mr. Evans.*) Then you do not know of any accident that could have been prevented either by the men being more careful or more supervision being exercised by the manager or the officials?—No, I cannot say that I do. I believe that every care is taken, as far as the knowledge of the men and the officials enables them.

763. You are not aware of any accident that took place in consequence of carelessness on the part of the men?—No, I cannot refer to any just now.

764. (*Mr. Jenkins.*) Are there minor accidents which take place frequently in the mills?—Only the accidents I have already referred to, such as cuts and bruises.

765. In what way do they generally occur?—Some of them happen owing to the absence of mind of the men; for instance, when they put blocks on the table the man on the one side may not understand the intentions of the man on the other side. It very often happens that slight accidents occur as the result of a little misunderstanding of that kind.

766. Do accidents sometimes occur in connexion with the machinery?—Yes. Accidents have happened where men have put their hand or fingers under the knife of the dressing machine.

767. (*Mr. Evans.*) There was one man killed above-ground in the Oakeley quarries by machinery; do you know anything of that case?—No, I do not remember.

768. (*Mr. Jenkins.*) Are there other causes for these minor accidents besides men putting their hands or fingers in the dressing machines?—I do not recollect just now.

769. Can you suggest any means of preventing accidents of that kind?—No, I cannot. It is very apparent that these accidents are due to carelessness on the part of the men themselves, and that with more care, I believe, they might be prevented.

770. When they put their hands in the dressing machine, does that generally happen when they are leisurely doing something or when they are busily at work?—It happens as a general rule when a man is looking about him in a careless sort of a way, and he puts his hand too far in. At other times he may put a piece of slate which is too small under the knife, and the knife may catch his hand.

771. When you are not working do you as a rule stop the machinery?—Yes, we do, so that the knives may not turn.

772. That is generally done, is it?—Yes, and there is a rule on the subject.

773. And is that rule always carried out?—It is generally carried out, but I believe there are exceptions.

774. (*Chairman.*) Is there in nearly every case a loose pulley to each sawing machine?—Yes.

775. (*Mr. Evans.*) Are you quite satisfied with the rules that are at present in force at the Oakeley quarries?—I am not aware that I can suggest any improvement in them at all.

776. Are the rules you have adhered to?—Yes, they are.

777. Strictly?—Yes.

778. By the officials and the men as well?—Yes, they are.

779. (*Chairman.*) Have the officials sometimes prosecuted the men for breaches of the rules?—Yes, they have done that several times.

780. (*Mr. Jones.*) Have you any sanitary arrangements in your mill, and if you have, what are they?—No, there are none.

781. (*Chairman.*) Are there privies scattered about in the open part of the Oakeley quarries?—No, I do not know that there are.

782. (*Mr. Jenkins.*) Where do you go to obey the calls of nature?—(*No answer.*)

783. (*Mr. Evans.*) Is there any nuisance in consequence of the absence of privies?—Our custom is to go rather far away from where we work.

784. But is there any nuisance caused owing to the absence of proper privies?—No, unless it occurs in consequence of the men making water.

785. You do not consider it necessary that there should be privies at the quarry?—It would be very desirable if there were some.

786. What are they required for if there is no nuisance arising from their absence?—They would be useful in this way, the men would not have to go so far away from their work as they go now.

787. Then they would be useful as a means of saving time?—Yes.

788. (*Mr. Jenkins.*) Are you obliged to go to exposed parts of the quarry for that purpose at the present time?—Yes.

789. What about the drinking water at your quarry; is it good?—We get it from Allt Fawr, the high hill behind the quarry.

790. Is it good water?—Yes, but I believe it is better where it starts from. It is not so good after it has come through the pipes.

791. (*Mr. Evans.*) What kind of pipes are they?—Iron.

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Mr. RICHARD JONES, Capel Garmon, examined.

792. (*Chairman.*) Where do you live?—At Capel Garmon.

793. And where do you work?—At the Middle Oakeley quarry.

794. Do you work above-ground or underground?—I am working outside now.

795. What are you at the quarry?—Rockman.

796. And where are you working now?—In a pillar in the "fall."

797. Outside?—Yes.

798. In the open air?—Yes.

799. Have you worked underground?—Yes.

800. For how many years?—For about 14 years.

801. And how long have you worked above-ground on the "fall"?—For about 18 months.

802. Can you give us any information which would enable us to offer suggestions for improving the health or ensuring the safety of the men engaged in this occupation?—I am not aware that I can.

803. What are the dangers to which you are most exposed?—Falls of rock upon us, and also explosions.

804. How can you, in your opinion, be best protected from falls?—The best way of preventing those accidents, as a rule, is for the men to exercise more care themselves.

805. When you are working underground are your chambers or openings inspected from time to time by the agents of the quarry?—Yes, they are.

806. In what way are they inspected?—If there is any suspicion of danger they erect a ladder or use a Wells light.

807. And do you think the dangers can be sufficiently detected in that way?—Yes, I believe they can.

808. What machinery have you to use; do you use cranes?—Yes.

809. Do accidents happen from time to time with the cranes?—Yes, owing to the carelessness of the men, as a rule.

810. Do you think it would be advisable to have a ratchet and pawl on the cranes?—Yes, I think they would be very useful.

811. You think they would be useful?—Yes, they would be useful in holding a big stone, but we manage very well without them.

812. When accidents happen with the cranes, do they as a rule happen when the stone is being lifted or when it is being lowered?—They happen in lowering the stone, as a rule.

813. Would a pawl be of any use in that case?—No, not at all.

814. (*Mr. Evans.*) I suppose you have frequently selected a stone which has been rather too large for the crew that have to turn the crane?—No, I am not aware. We could not turn it.

815. Did it ever happen to you that you lifted a stone which turned out to be rather too much for you and where you would like to take your breath before finishing?—That depends upon the number of men at the crane.

816. Have you ever known of instances where the crew employed have been too small to wind the stone up without taking their breath?—Yes, I have.

817. Do you not think that the pawl would be of advantage in a case of that kind?—It would do just the same as the chain we use at present and which we put in the cog wheel.

818. Do you think that chain is always safe?—I have never seen one run.

819. Do you not think that it endangers the wheel?—I do not think it does any more than that would.

820. That has nothing to do with the cog wheel, it is an outside thing altogether?—I do not know anything about it.

821. Then you cannot express an opinion on that point?—No, I cannot.

822. (*Mr. Greaves.*) Do the officials attend promptly to any complaints made to them as to the condition of the machinery or to any danger in the working places?—Yes. We are not allowed to work in any dangerous place if they know of it.

823. And whatever defects there are are promptly attended to?—Yes, they are attended to at once.

824. (*Mr. Jones.*) Suppose you have a block on the crane and perhaps two or three or four men working at it, how many will there be at the handle when you go to lower it?—Two.

825. Do you think that one or two men, as they used to be sometimes, have attempted work too heavy for them and have thus brought about an accident?—I am not aware.

826. (*Mr. Greaves.*) Have you ever tried a crane worked with a worm-gear?—No, never.

827. (*Mr. Jenkins.*) Are there always two men engaged in lowering stones?—Yes, if the work is too much for one.

828. Do these accidents in connexion with cranes occur generally when the stone is a large one and difficult to lower, or when you are lowering small blocks which are easily lowered?—As a rule, they happen in the case of small stones, and are owing entirely to want of care.

829. I believe you said you had worked underground for 14 years?—Yes.

830. Were you a rockman for these 14 years?—Yes.

831. You have said that accidents occur from falls of rock?—Yes.

832. Where do those falls come from?—From the pillars very often.

833. Are these pillars inspected as a rule?—If there is any doubt about them an inspection is made.

834. By what means are they examined?—If there is any necessity for a ladder, one is used, but a Wells light is tried first of all, and afterwards a ladder if it is thought necessary.

835. How far can you see with the Wells light?—We cannot see very well with it at a distance.

836. But how far can you see properly?—About 10 yards or so.

837. Can you make sure, within 10 yards, that a place is safe, simply by looking at it?—Yes, I believe we can.

838. (*Chairman.*) Can you make sure that the rock is safe without sounding it?—Yes, if we do not see cracks in it.

839. (*Mr. Jenkins.*) Are there inspections by the officials of the quarry by other means than by the Wells light?—No, I am not aware that there are examinations overhead. They cannot possibly do it otherwise.

840. Are the inspections by means of the Wells light made by them periodically, or how?—They are made in places where there is any doubt as to their safety.

841. But are they made periodically throughout the quarry?—I do not know that they are.

842. When do they use the ladders; do they raise them except when something falls down?—Yes, in places where there is suspicion that there is something wrong.

843. Is it a difficult thing to raise these ladders?—Yes, it is, in my opinion.

844. And does it take a long time to raise them?—Sometimes it does, especially in the case of a long ladder. It very often takes four days to fix one, and to put the pegs and everything.

845. You say it is always done when anything falls down?—Yes, it is.

846. (*Chairman.*) Are they used after an accident, or when some rock has fallen?—When there is any doubt about a chamber they raise the ladders whether anything has fallen or not. In cases where the rock has fallen they raise them at once.

847. (*Mr. Jenkins.*) In your opinion, should that be done oftener and periodically?—I cannot say. If that were done it would mean a lot of work.

848. You say there is a good deal of care taken at the quarry at the present time; do you remember the time when it was otherwise?—(*No answer.*)

849. Has there been an improvement within your memory?—Yes, there has.

850. A great improvement?—Yes.

851. Have you worked in any other quarries?—Yes, I have.

852. Did you see the same care taken in those quarries as at the Oakeley quarries?—Yes, I have seen care taken, but not so much as at our quarries.

853. Have you reason to think that the same improvement has taken place in that respect in those other quarries by now?—I believe so, as far as I know.

854. You live at Capel Garmon, I believe?—Yes.

855. And do you go home daily or weekly?—I go home every night now, but I used to go once a week only.

856. When you went home weekly did you live in lodgings or in barracks?—In lodgings.

857. Have you been living in barracks at all?—Yes, I have.

858. What is your opinion about barracks generally, and their effect on the health of the workmen?—They have been very much improved lately, compared with what they used to be years ago.

859. (*Chairman.*) What barracks were they that you lived in? Were they barracks belonging to the quarry or to some private person in the neighbourhood?—They were barracks belonging to people in the village.

860. How many men were there living in the same room in those barracks?—Four.

861. And had you a separate room to take your meals in?—No, we had not.

862. Had you to eat and sleep and do everything in the same room?—Yes, there was only the one room.

863. (*Mr. Jenkins.*) What was the size of the room?—I cannot say what it was.

864. (*Chairman.*) Are those barracks still in existence?—Yes.

865. (*Mr. Jenkins.*) How many men are there living in it at the present time?—I do not know.

866. (*Chairman.*) Could you tell us where they are situated exactly, as we would like to see them?—Yes.

867. What is the address?—They are at Rhiwbryfdir, and they belong to John Roberts, Pantyronen.

868. (*Mr. Jenkins.*) You have nothing to suggest as to how to prevent accidents from falls of ground?—No, I am not aware that I can suggest anything.

869. You say you work in the "fall"?—Yes.

870. Is there a tendency in the "fall" to become more dangerous, the more you clear of it?—No, I do not know that there is.

871. (*Mr. Greaves.*) Are you aware of the special rules at present in force at the Oakeley quarries?—Yes.

872. And are those special rules strictly observed both by the workmen and the managers?—Yes, as far as I know, they are.

873. (*Mr. Jenkins.*) Are they all carried out?—Yes, as far as I know.

874. (*Mr. Evans.*) You are a rockman?—Yes.

875. When did you begin to work as a rockman?—About 17 years ago.

876. Had you been doing any work, before that?—Yes, a little.

877. What work were you engaged in at that time?—I worked on a farm.

878. And were you taken from the farm to be a rockman direct?—No.

879. Then what did you work at after leaving the farm, and before commencing as a rockman?—I was with the waggons for a short time.

880. For how long were you with them?—For about six months.

881. Had you any opportunities during those six months of learning anything about the rock before you were taken on to work there?—Yes.

882. What opportunities had you?—I was anxious to be taken on as a rockman, and I made use of every opportunity I could get to learn to drill.

883. Did you ever use powder before you commenced to work as a rockman?—No.

884. How soon after becoming a rockman were you allowed to use powder?—Not for some time.

885. For how long?—About a month. A man used to tamp before I was allowed to use it.

886. Were you under the charge of someone else who looked after you for some time after you commenced to work on the rock?—Yes, the master.

887. Do you mean the officials of the quarry or the bargainer?—The bargainer.

888. From your experience, do you find that places which are not suspected sometimes become dangerous without its being known?—Yes, I do.

889. In consequence of the effects of the weather or of water or something of that kind?—Yes, quite so.

890. That being so, do you not believe that a periodical inspection should be made of all places which are not under the special care of the workman at the time, and which are not suspected?—Perhaps it would be a good thing.

891. Do you know of any accidents which have taken place in consequence of rock falling from a place which nobody suspected of being dangerous?—Yes, I do know of such cases.

892. Would that not justify there being a periodical inspection of places where men may be in danger of things falling in that way?—Inspections might be made, and yet the accident might happen notwithstanding.

893. Do you think that a knock with the hammer enables you to tell with certainty whether a place is safe or not?—We have no other way of testing it, as far as I am aware.

894. Do you think you are certain to detect a dangerous place by simply striking it with the hammer?—We believe that you can. At any rate, we have no other way of doing it.

895. But accidents do happen, although you do your best to discover dangerous places before they occur?—Yes, they do.

896. How old were you when you came to the quarry first of all?—I was 15.

897. How soon after becoming a rockman did you consider yourself a competent workman, and able to take charge of a bargain?—I got a bargain in about two years afterwards.

898. Did you consider yourself competent before that?—Yes.

899. What time do you consider is sufficient to enable a labourer to become a competent rockman, speaking generally; you were young when you undertook the work, but how long do you think a labourer, say, 18 or 20 years of age, ought to take before he becomes a competent rockman?—That is a difficult question to answer, as men differ.

900. But taking men generally?—It all depends on the man himself.

901. Can you tell us in what time after a man begins work it is generally considered he is capable of taking a bargain?—I cannot say.

902. (*Mr. Jones.*) Putting yourself out of the question, what does your 17 years' experience teach you as to the average time required for a man to become a competent rockman?—Two or three years, I should say.

903. Were you ever ambitious to become a slatemaker?—I tried it, but I was never anxious to become one.

904. Do you think you could learn the work after reaching 17 or 18 years of age?—Yes, I believe I could.

905. Do you know of anyone who did learn it after reaching that age?—No, I do not.

906. But you think it is possible to do so?—Yes, I do.

907. Do you know the cause of any of the fatal accidents which have taken place at the Oakeley quarries during the time you have been there?—No, I do not.

908. Have you seen any fatal accidents there?—Yes, I have.

909. And were you present when any of them happened?—I was not close by.

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910. Then you do not know the cause of any of them? —I was pretty near the place where Richard Roberts met with the accident.

911. When was that, and how did he meet with the accident?—I do not remember the date.

912. Do you know the year?—It was the case of Richard William Roberts.

913. (*Chairman.*) That was the case where he went back too soon after blasting, and a small piece of rock fell down and struck him on the back?—Yes.

914. (*Mr. Evans.*) Do you know why that man went there too soon, sooner than it would be reasonable for him to go?—No, I do not.

915. Do you know of any other fatal accident?—I know of the accident to Owen Jones.

916. (*Chairman.*) Is that Owen P. Jones, the agent? —Yes.

917. (*Mr. Evans.*) That was an accident with the crane, was it not?—Yes.

918. Do you know of any other accident of a serious character which happened in consequence of neglect or insufficient care on the part of the men or the officials? —No, I do not.

919. Do you agree with the account given by Mr. John Owen (the previous witness) as to your mode of living in this district?—Yes.

920. You follow his mode of living?—Well, it is not exactly the same.

921. Are you fed better or poorer than he is? Do you take beer instead of tea?—No, I take buttermilk.

922. (*Mr. Jenkins.*) Are the quarrymen generally sufficiently clad?—Yes, I believe they are.

923. What do they wear?—Fustian, or corduroy.

924. Do they wear flannel next to the skin?—Yes, they do as a rule.

925. Which do you consider the healthier, your previous occupation or the present one—that of the agricultural labourer or the quarryman?—It is about the same, I should think. At all events I have enjoyed very good health in both occupations.

926. What was your age when you came to the quarry first?—I was 15.

927. Did the change affect your health in any way when you left the farm and commenced to work at the quarry?—No, I do not know that it did.

928. You work at present in the open air, do you?— Yes, in the "fall."

929. (*Mr. Greaves.*) Are you aware of any unwillingness on the part of the quarrymen to come forward to give evidence before this Committee; are they afraid of incurring the displeasure of the agents or owners of the quarry?—No, I am not aware of anything of the kind.

930. (*Mr. Jones.*) Why did you come here to give evidence?—Because the workmen and the masters asked me to come.

931. (*Chairman.*) Both the men and the masters asked you to come here?—Yes.

932. (*Mr. Evans.*) You are not here to represent any party?—No, but the men and the masters asked me to attend.

933. (*Chairman.*) You say you live at Capel Garmon, and that you now go backwards and forwards every day by train?—Yes.

934. You go and come morning and evening?— Yes.

935. Are the trains convenient now, so that you can get away in the evening without waiting about in your wet clothes?—Yes, they are convenient in the evening.

936. Has there been any improvement in that respect lately; had you to wait about for a considerable time until the beginning of this month when the trains were altered?—Yes, we had to wait a good deal until the beginning of this month.

937. What about the morning; are the trains convenient for your work in the morning?—No, they are rather too early.

938. What station do you leave?—Bettws-y-coed.

939. And what time does your train leave?—At 5.25 a.m.

940. What distance have you to walk to the station? —About a mile.

941. Then you do not live in the village of Capel Garmon?—No.

942. Does that train bring you up here too early for your work in winter?—Yes, it does.

943. How long have you to wait about before commencing work?—About an hour and a half.

944. (*Mr. Greaves.*) Do not you find that it adds very much to the labour of the day, travelling night and morning in that way?—No; I find myself healthier now that I am doing that.

945. (*Chairman.*) What time do you get home in the evening?—At 6 o'clock, or a little later. If the train is in good time I reach home at 6 o'clock.

946. And you leave home at 5 o'clock in the morning?—Yes; about five minutes past five.

947. How is it in the summer months—are the trains more convenient then?—Yes; the morning train is about right in summer.

948. (*Mr. Jenkins.*) You say that the men are warned to be careful by the officials; are they always careful after having been warned in that way?—I cannot speak as to everyone.

949. Do you know that there is a tendency among the men to be careless in some cases?—Perhaps there is.

950. But you do not know of any particular instance? —No, I do not know of any.

951. (*Mr. Evans.*) Do you think that the men ought to be prosecuted for breaking the rules?—It is their own safety that is in the question.

952. But do you consider that the breaking of the rules is so important a matter that the men ought to be prosecuted for it, seeing that the safety of the men depends upon the rules being properly adhered to?— I cannot say anything as to that.

953. (*Mr. Jenkins.*) Do you approve of all the rules at present in force?—Yes, as far as they go. They are the best rules for us at the present time.

954. Do you know of any of them that are not carried out by the men themselves?—No, I do not.

955. What about Rule 73, as to wooden rammers; is that carried out by the men?—It is impossible to observe that rule under certain circumstances.

956. Can you give any reasons for that?—When we have a block which only requires half-an-inch of tamping, we cannot possibly put more without spoiling the block, and we cannot make it hard enough with a wooden rammer.

957. We had it in evidence yesterday that the brass rammers are not used in some of the quarries, and that they are kept as ornaments; is that the case to your knowledge?—They are used everywhere, as far as I know.

958. (*Mr. Greaves.*) You say the copper rammers are used?—Yes, they are.

959. (*Mr. Jenkins.*) Is there any complaint against them?—The tampers are better now than they used to be.

960. (*Mr. Evans.*) Have the men any objection to use these brass tampers?—Yes, they had at first, when they used to bend.

961. Because they were not useful or practicable?— Yes.

962. Do you know of any accidents which have taken place by using iron tampers?—No, I do not know of any.

963. Do you generally re-open a hole that has missed fire?—No.

964. You do not think it would be safe to re-open a hole which has missed fire?—No, I do not think it would be at all times.

965. (*Mr. Greaves.*) If the special rules are carried out in a thorough and proper manner do you consider that all would have been done that could be done to ensure the safety of the men?—Yes, I do.

Mr. ROBERT DAVIES, 160, Manod Road, Blaenau Festiniog, examined. *Mr. R. Davies.*

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966. (*Chairman.*) What are you at the quarry?—A rockman.

967. Where do you work?—At the Lower Oakeley quarry.

968. You know the object of this inquiry—to endeavour to make your occupation safer and more healthy; can you help us to do that by offering suggestions?—I do not know that I have anything to suggest, but I shall be glad to answer any questions.

969. What are the most common kind of accidents that happen, as far as your knowledge goes?—They differ. Sometimes explosions, and sometimes falls of rock. Accidents also happen on the incline.

970. With regard to falls of rock, have you had much experience in that direction; have you known rock to fall from above and injure the men?—Yes, I have seen that at different times.

971. And does the rock sometimes fall from a great height, from the roof or from the pillar?—Yes, it very often falls from very high places.

972. What is the best way of preventing accidents of that kind, in your opinion?—To be more careful with those places while they are within reach.

973. Supposing every care has been taken when the men are within reach, and that after a lapse of years from natural causes the rock gets weaker, how can you best ensure the safety of the man who works underneath?—Only by trying to go there, if that is possible, to remove what is loose and dangerous.

974. How do you find out that it is loose?—It is difficult to know when it is 50 or 60 yards away from you, unless you can go there and test it with the hammer; but it is very often difficult to do that.

975. How do you examine the roof, with ladders?—By fixing blocks up inside the wall of the pillar, and putting ropes through them, and hauling the ladder up.

976. How long does it take you to fix a set of ladders 20 yards long?—We can fix one of that length in two days. We have one at present which is 34 yards long, and that is the longest we have ever had.

977. How long did it take you to fix that ladder?—Four days.

978. And after a ladder of that kind is rigged up, how many are there amongst your fellow-workmen who can work at the top of it?—I question very much whether there is one out of 20 who can do so.

979. (*Mr. Greaves.*) Within your knowledge do you remember an accident happening while examining a roof from the use of one of these very long ladders?—No, I do not know of anything of the kind, and I have been at the work at various times during the last 20 years.

980. (*Chairman.*) Did not one of the ladders break once with a man on it?—Yes, one ladder broke, but nobody was hurt.

981. (*Mr. Greaves.*) Can you judge of the state of the roof at those spots which you are able to reach with the hammer, and tell whether it is dangerous or not?—Yes, we can.

982. (*Mr. Jones.*) Can you be certain with the hammer alone? Supposing there is a big area or a large thickness to be tested, can you ascertain whether it is dangerous simply by using the hammer?—No, not altogether; but if it has moved out of its place there are signs of it to be seen in some place or other.

983. Is the hammer of any use in a case of that kind?—No, they are too large for you to be able to tell simply by using a hammer.

984. That being so, the hammer will only show a comparatively small defect?—Yes, that is so.

985. Have you known of instances where you have been to make these inspections, and having been perfectly satisfied that there was nothing dangerous, and afterwards in a few days or a few weeks something has fallen down from the very places that you considered safe?—We have been very lucky in that respect. I do not know of anything of the kind.

986. (*Mr. Jenkins.*) If you cannot tell whether it is dangerous or not with the hammer you can by some other means, can you?—If a large piece is moving, small pieces will fall off from time to time, or there will be some signs somewhere.

987. And you can tell from those signs?—Yes, we can.

988. Did you say that you had to go up 50 or 60 yards?—We cannot go that distance with the means we have in use at the present time. We have often gone to that height, but we had to start from another floor.

989. (*Chairman.*) What would be the height of the highest chamber in your quarry?—I believe it is from 50 to 60 yards.

990. (*Mr. Jenkins.*) Would it require a ladder 50 or 60 yards long to go there?—Yes.

991. Can you tell us what is the thickness of the vein there all through?—No, I cannot say exactly. There are many who know far better than I do.

992. Supposing a chamber is worked home, what would be the length of a ladder from that place to the clay-slant?—From 50 to 60 yards, as I have already said.

993. Do you always leave the places we have been speaking of in a satisfactory condition, or as you would like them to be?—Yes, always.

994. So that you have no fear that anything will come down from them?—No fear at all.

995. Do you consider that you leave it always in the best condition that you can leave them in?—Yes.

996. When you leave a place as safe as you can make it at the time, although it may not be in quite a satisfactory condition, is there any care taken to look after these places afterwards?—We see that it is either safe or that it is not.

997. You have worked in the Lower Oakeley quarry for a long time?—Yes, I have worked there for 30 years.

998. Is there proper care taken at that quarry now?—Yes, splendid, better than I have ever seen.

999. When anything has fallen down what is the practice with regard to it at the present time?—The men who work under the place are stopped until proper inspection is made of it.

1000. And do they invariably use ladders?—Yes, they do, at once.

1001. (*Chairman.*) Do they occasionally use ladders and make an inspection of that kind without any fall having taken place?—We often take a light through the quarry to examine it, but we do not use ladders as a rule until something has happened, it would take too much time, if you only take one chamber into consideration, the length is about 300 yards.

1002. (*Mr. Jenkins.*) Has there been a great improvement at the quarry during your time?—Yes, there has, of late years.

1003. Can you tell us what the general custom was when anything came down in years gone by?—They used to try to look into the matter, but not with such care as is used now.

1004. Was it usual to raise ladders at that time?—Yes, it was, to a certain extent.

1005. Do you think that the present system has done much to prevent accidents; has the improvement which has taken place tended to reduce the number of accidents?—Yes, I believe it has.

1006. What is the opinion of the workmen in general on that point?—I believe they agree with me.

1007. You said a few minutes back that more care would be likely to prevent accidents; can you suggest anything on that point?—Only that the men should be more careful, and every danger should be removed while it is within the reach of the men, and someone should be present to see that the men do it.

1008. Is there a tendency among the men sometimes to leave loose things that are liable in time to become dangerous, and not take any notice of them?—Yes, they very often leave that sort of thing until some future time, and consequently it often escapes their attention altogether.

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1009. Could you suggest any means of remedying that state of things?—The only way would be to set someone in authority to look after such places.

1010. What do you mean by "one in authority"; do you mean one of the agents, or whom?—Yes, I think so. Of course they do as well as they can, but perhaps a little more might be done by going down with chains along the rocks, to see how the men work their bargains.

1011. Would you suggest that a man be kept for that purpose solely, and to see that the men are carrying out the instructions of the manager in every way?—I believe they might be more exact.

1012. (*Mr. Jones.*) Supposing you have four men looking after you, and a fifth were added, do you think the men would be more likely to obey the fifth than they are at present to obey the four?—Of course they are told now that they are to see that everything is safe.

1013. (*Mr. Jenkins.*) But there is a tendency in some of us not to do that unless we are looked after; would it tend to prevent such a thing if the men knew that someone would come after them to look at the pillars, and test them, and so on?—Yes, I believe so.

1014. (*Mr. Jones.*) Is it, or is it not, the duty of your present managers to look after the proper working of the pillars?—Yes, it is their duty certainly.

1015. (*Mr. Jenkins.*) Supposing there were two or three joints, one higher up than the others, and you blast the lower one, would there be any danger of the pillar "scribing," thereby causing a weakness which might cause trouble in the future?—Yes.

1016. That would be likely to lead to a "scribe" which would work mischief in the pillar?—Yes, it would.

1017. Do you think that that kind of thing is done in some cases at the present time?—I have seen signs of carelessness in that respect several times.

1018. I suppose you have had opportunities of seeing cases of this kind when examining with ladders?—Yes and with light as well.

1019. Upon whom would you put the responsibility of seeing that this danger is diminished?—It ought to be upon someone who has had experience in the work.

1020. Are you prepared to leave it with the men themselves?—I can only reply, as I have done already, that the tendency of the men is to pass it by.

1021. (*Mr. Evans.*) Although you do your best to make these roofs safe something does come down afterwards, I suppose?—Yes, but at our quarry we have been very fortunate. Nothing has come soon after we have been to examine a place.

1022. What you want to impress upon us is that the officials should be a little more careful in looking after the men and in seeing that they carry on their work properly, apart from any rules?—I do not say that they do not do their duty as far as they are able, but they cannot possibly be everywhere.

1023. Do you give us to understand that they have too much to do at present to attend to that?—I believe they have, or that is my experience at any rate.

1024. You believe they do as much as they can be expected to do?—Yes, they do everything that can be reasonably expected of any man.

1025. Do you think this is a matter which ought to have the special care of the management of a quarry?—Yes, I believe it ought to have more attention.

1026. (*Mr. Jones.*) Or that there should be a special man to attend to it?—Yes.

1027. (*Mr. Greaves.*) What do you mean that there should be a special man to see to what?—Just as he finishes one layer after another.

1028. At what intervals would that be?—Every year or so.

1029. Do you mean to say that the present staff of officials is not sufficient to visit the bargains once a year?—They go much oftener, but to go down with ropes to examine them is quite a different thing.

1030. But they have plenty of time to do it?—That is very doubtful.

1031. (*Mr. Jenkins.*) You said that only 1 in 20 of the men can go and work on the top of the ladders?—Yes.

1032. Could the number of men be increased by practice?—Yes, I believe so.

1033. (*Chairman.*) By beginning young?—Yes.

1034. Which is the easier, to rig up the ladder or to work on the top of it after it is rigged up?—Both are very difficult.

1035. Have you proper privies, or any privies at all at the quarry?—There are some outside, but none under-ground.

1036. How many are there outside?—I do not know the outside so well.

1037. And what is the practice of the men inside?—They go out as a rule, but we cannot reach there in time always.

1038. (*Mr. Greaves.*) Are you aware that there is any unwillingness on the part of the quarrymen generally to appear before this Committee for fear of incurring the displeasure of the managers, agents, or owners?—No, I am not.

1039. Are you aware that the quarry is being worked under special rules?—Yes.

1040. Are those special rules fully observed and carried out by both men and managers?—We aim at that, but I do not know whether we have reached perfection yet.

1041. But everybody does his best to carry them out?—Yes.

1042. And if they are carried out do you consider that all is done that can be done to insure the safety of the men?—Yes, I believe so.

1043. Do the officials always attend to any complaints that may be made from time to time with reference to any defect either in the rock or in the machinery?—Yes, at once.

1044. Do you consider that proper supervision is provided by the present staff?—I have already suggested that it is possible they might be a little more careful with dangerous places.

1045. (*Mr. Jones.*) In addition to falls, you mentioned that accidents occurred through explosives and on the inclines?—Yes.

1046. (*Mr. Evans.*) Are the pillars kept in their proper width?—I cannot tell. I am not in the habit of measuring them.

1047. Are you aware that some of them are made too thin?—I believe there is more care taken at present. Some of them are very narrow. I do not know what the right thickness is.

THIRD DAY.

At the Cocoa Rooms, Blaenau Festiniog, 20th December 1893.

PRESENT:

DR. C. LE NEVE FOSTER IN THE CHAIR.

MR. J. E. GREAVES, J.P.	MR. J. J. EVANS, F.G.S.
MR. E. PARRY JONES, J.P.	MR. JOHN JENKINS.

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Dr. ROBERT ROBERTS, J.P., Isallt, Blaenau Festiniog, examined.

1048. (*Chairman.*) You are a doctor of medicine?—I am a physician and surgeon, but not an M.D.

1049. And you have been practising here for a great many years?—Yes.

1050. Since when have you been in practice here?—I commenced to practise here in 1862, so that I have been here for 31 years.

1051. You have been at Blaenau Festiniog, during the whole of that time?—Yes; in fact I have been here all my lifetime. I was apprenticed here first of all, and I have been in practice as a qualified medical man for 31 years.

1052. Can you tell us what, in your opinion, are the principal dangers to health, life, and limb entailed by the occupation of the quarryman of this district?—The occupation of a Festiniog quarryman must be classed among the "dust-inhaling" occupations. I contend it may be fairly inferred that this inhalation of dust, smoke, and the products of explosives underground, together with the natural dampness and coldness of the slate rock itself, with which he (the quarryman) is in continual contact, must have a deleterious effect upon his health.

The finest particles of slate dust, under a ¼-inch objective, are angular, and one would suppose they would give rise to irritation and cough when inhaled deeply into the air passages; but from my experience and the testimony of the workmen, even the youths, it does not do so to any appreciable extent, which may be accounted for by its comparative softness and the ease with which it mixes up with the natural secretions of the air passages to form a clayey pulp favourable for expulsion.

The irritating quality of the different kinds of dust is estimated by the amount of free siliceous matter they contain, and in the Festiniog slate, which is manufactured for roofing purposes, I do not think there is any free quartz. Nevertheless, many of the men employed complain of lassitude and thirst, and it is hard to know what gives rise to these sensations unless it is the extent to which they have to depart from normal hygienic conditions in the performance of their work. The atmosphere in which the Festiniog quarryman lives during working hours one may say is generally clouded with dust.

In the year 1890 I wrote a paper on "Slate-quarrying "as a dust-inhaling occupation." The only figures I could then get were that among an average of 3,500 quarrymen over 14 years of age, there had been, during a period of 10 years, 102 deaths from phthisis. The deaths were classified under three headings, viz., slate quarrier, slate miner, and slate labourer, and the figures showed that out of the 102 deaths, 53 were slate quarriers, 29 slate miners, and 14 slate labourers; and the question which suggested itself to me was whether it was a fact that 50 per cent. of these deaths from phthisis were among the slate quarriers (working at the mills) as against the slate miners (underground) and labourers combined. On subsequent investigation I discovered that this classification could not be absolutely relied on, although it was a correct copy from the registrar's books, and I have reason to believe that the registrars of the district do not, even to this day, classify the deaths with the required accuracy, because about 50 per cent. of the slate quarriers still appear on the register as dying from phthisis as against the miners and labourers combined, and the question still remains to be asked—is it a fact?

My object when writing that paper was simply to compare the death rate *from phthisis alone* among the different sections of the men employed in the quarries as such, and not to compare the death-rate of quarrymen with those not engaged in the quarries; and before we arrive at figures which can be of any value in this respect we should have the different classes of men employed in the quarries properly defined and classified and registered accordingly, and also, with the view of ascertaining the amount of current diseases of the respiratory organs among the quarrymen, the medical men should keep a record.

I think that, next to indigestion (which is not of necessity incidental to the quarryman's occupation), rheumatism is the most common complaint he suffers from, *e.g.*, lumbago, stitches, and muscular pains, caused, I presume, by a combination of circumstances, viscissitudes of the weather, perspiring, living in draughts of cold air, and by the natural dampness and coldness of the slate rock as compared with the sandstone or igneous rock. Miners who have had experience of working both kinds of rocks say they cannot sit or lie with the same impunity on a slab of slate as they could on a block of granite or sandstone without suffering a chill.

The fitful nature of the quarryman's work renders him peculiarly liable to chills and their consequences which will produce the next numerous and the most serious and fatal class of diseases, viz., pneumonia, (inflammation of the lungs), bronchitis, pleurisy, and the usual pulmonary affections, including phthisis and its varieties, but I may say I never had the opportunity of making or learning by a post-mortem examination that any of the Festiniog quarrymen died of a silicosed (or stonemason's) lung, although I entertain a strong opinion such must have happened and will happen.

In addition to the above-mentioned circumstances, and which are to a certain extent inseparable from the quarryman's occupation, there are others which increase the amount of illness and the number of deaths, and against which (humanly speaking) he could to a great extent protect himself; for instance, the great amount of wet, which owing to the configuration of our locality as well as its altitude, he has to contend with. This calls upon him to provide himself with proper clothing for going to and returning from his work, and it would be very desirable, if practicable, to make some arrangements whereby the men may dry their clothes at the quarry. I may also add that the nature of their occupation, as I have described it, is such as calls upon them to wear suitable flannel underclothing. I believe this is pretty generally the case, but the bulk of the men are in the bad habit of wearing their flannel (and many sleep in them) unchanged either night or day for too long a period. A fortnight, I understand, is the rule, but some wear the same flannel unchanged for even a longer period than that, a month, and consequently deprive themselves of the non-conducting property and protective warmth of the flannel.

The slate quarryman, who of necessity must have his whole apparel saturated with the different kinds of dust floating about him, has his skin also covered by the same, and he ought to have a thorough wash every evening and change his clothing, so that he may have his day clothes dried, well aired, and brushed to put on again in the morning. From a sanitary point of view he needs it as much as the collier, who enters his tub every evening on returning from work. The quarryman who neglects proper ablutions has a fine layer of clay on his skin, but not so conspicuous in colour of course as that of the colliers. Ablutions are sadly neglected, and it is to be deplored that we have no public baths erected in such a populous district, and one which, from the nature of the occupation of its inhabitants, has a special claim to it.

It is also very desirable that the railway companies should make the best possible arrangements and accommodation, so as not to keep the men waiting unnecessarily at the stations in all kinds of weather; and I think it will become a question in the near future whether disease and death will not be perceptibly increased among the quarrymen as the result of the extra time and excessively long hours those residing outside the district, and travelling home and from home daily in the trains, must spend at the expense of the hours of rest so necessary to them, and which they would secure if they lived nearer the works.

As to the question of feeding, the Festiniog quarryman is open to the common reproach of drinking too much tea. No doubt he deserves it, but probably to no greater extent than his neighbours, and I believe there is too much truth in the charge that the older quarrymen have, by feeding themselves so exclusively on bread and butter and tea, spoiled their appetites for the more substantial kinds of food. But I do not think this applies so much to the rising quarryman, and judging from the amount of meat, vegetables, and condiments, &c. consumed weekly; and if all be properly utilised (I say this because I fear there is a great want of domestic thrift and economy) I do not think the quarryman lives so niggardly as he is represented to do.

As the men cannot as a rule go home for a mid-day meal, nor can they in many cases all meet in one eating-house, owing to the area over which they are scattered in the quarry, it seems to me that a substantial sandwich, with a cup of tea *properly prepared*, would form a refreshing mid-day meal, provided the men have a dinner when they return home in the evening, and have time to rest after it.

The housing of the quarrymen is upon the whole satisfactory, but the subsoil being generally composed of clay and peat, and the dip of the strata upon which most of the houses are built at Blaenau Festiniog being in opposite directions to the dip of the natural drainage, I conclude the foundations must be damp, a circumstance which is now generally considered a factor in the production of consumption and other diseases. I only know of two or three houses in our

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locality having any pretence of having adopted damp courses.

The introduction of milk to Festiniog from a distance has produced a great improvement, I believe, in the health, especially of the children, and I believe Festiniog will compare favourably as regards the number of persons suffering from diseases of poverty and neglect, such as scrofula, rickets, skin diseases, &c., with most other places of equal population in the kingdom. No doubt the cheap provision which the Festiniog quarrymen have for medical attendance upon themselves and families will, in a great measure, account for this.

I understand the bulk of the excreta of the men is deposited in the quarries, and not at home, and this of necessity should call forth proper accommodation where it does not exist, and some means of compelling the men to use the same where it does exist. From the want of this, the air in the underground chambers may become vitiated, and the water draining from the excreta may pass through rubbish heaps and crevices and appear drinkable to the men, whereas it may really be polluted with sewage.

I may here mention that the men complain of more inconvenience from the dust in summer and dry weather. Many are thirsty, and it is highly important that a good supply of pure water should be within easy reach; and to minimise the quantity of dust which is much felt in dry weather but hardly perceptible in damp weather, I would suggest that a very fine spray be brought to play occasionally, so as to imitate the natural moisture of the atmosphere. At the same time, the spray should not be so great as to make the men's surroundings damp and disagreeable. Respirators and an artificial moustache and beard might be used. Periodical sweepings might also be suggested, but I believe valid objections can be brought against these and many other plans which might be suggested.

I do not believe a complaint can be made of want of ventilation in the mills, nor, under ordinary circumstances, in the chambers and levels; there being in the mills superabundant breathing space, an average of 5,000 cubic feet per man. In fact, the danger seems to arise from too strong currents of air to raise the dust and cause chills than from want of fresh air, and I think the most satisfactory state of things would be to have the ventilation as diffused as possible.

As regards the accidents, they have been materially reduced since the introduction of the Mines Regulations Acts. I may say that the accidents from falling from floor to floor have been practically abolished, and accidents from explosives have been materially reduced from what they used to be.

The chief accidents in years gone by were from falling from floor to floor, blasting, and persons being struck by stones thrown by the blast, "*lwmp oddiwrth y fire*," as it used to be called.

The graver kinds of accidents now are fractures of the limbs (especially thighs and legs) and general bodily injuries from the sudden slipping of rock down the forebreast of the bargains, and an occasional head wound and fracture of skull from falls from roof and pillars. The fact of the men working in underground chambers, which are practically dark, does naturally increase the chances of these accidents occurring.

Blows from the crane handles are still prevalent, as well as injuries to the fingers from the crane wheels and pinions, and the underground men are more liable to these accidents.

As to the slatemakers, and considering they do their work mostly by machinery, I contend the number of accidents is comparatively small; they are mostly of a slight nature, such as cuts and bruises and an occasional serious accident to the hand from the knife of the dressing machine, and also from the slate saw.

Respecting the treatment of injured men at the quarry before medical aid can be procured, this is of vital importance, especially as to the stoppage of bleeding, and the binding and supporting of fractures for and during transit. I am of opinion that the prescribed course of lectures by the St. John Ambulance Association, although most excellent, is rather too extensive to be taken up by the men generally, and I would gladly do my best to instruct them how to render "first aid" for the injuries which most commonly befall their fellow workmen. I think the men ought to avail themselves more than they do of the hospital accommodation and trained nursing that is provided for them, and I am sorry to say that only two of the Festiniog quarries (Oakeley's and Greaves') have such accommodation for their injured men.

The points I have referred to are those which strike me as being most deserving of attention, but I shall be pleased to answer any questions the members of the Committee may wish to put to me.

1053. (*Chairman.*) From your remarks I gather there is a want of knowledge of hygiene amongst the people?—Yes.

1054. For instance, if a man wears his shirt for a fortnight or a month he is not likely to be as healthy as if he changed it at shorter intervals?—No, certainly not.

1055. And that is one important point for the men to bear in mind?—I should think so. I know their habit is as I have stated, and they are very conservative about it. I have frequently been told that their practice is as I have just described, and I have been speaking often to many of them about it.

1056. May that not be due to a want of knowledge on the part of the mothers in bringing up their children?—It is owing to the want of attention to the ordinary rules of hygiene.

1057. There is one thing that you have not referred to; what is your opinion as to the barrack accommodation provided at certain quarries for the men?—I cannot say that I have visited the quarry barracks during the last few years, so I cannot speak from experience on that subject.

1058. Have you visited the barracks in the village?—Yes, I have visited two or three.

1059. And what is your opinion of those you have seen?—I think they are close, and they are invariably over-crowded.

1060. Are they barracks belonging to the quarry-owners, or do they belong to private owners?—They belong to private persons. I am not aware that there are any belonging to the quarry-owners in the neighbourhood, except on the quarry premises.

1061. You spoke about the medical attendance being provided cheaply to the quarryman and his family?—Yes.

1062. Would you mind telling us how that is done?—The arrangement is that the workman himself and his wife and children under 16 years of age, which practically means the whole of his family, shall be attended for a shilling a month. In Carnarvonshire it is different. I know that at Bethesda and Llanberis they have no provision for medical attendance upon the families of the quarrymen. The men pay so much a month there, and they alone receive medical attendance for that payment.

1063. Are we to understand that the maximum sum a quarryman at Festiniog would have to pay for medical attendance for himself and his wife and his children under 16 years of age would be 13*s.* a year?—Yes, that is so.

1064. Is there any inconvenience or danger in the delay in getting a medical man in some out-of-the-way places, and could that be remedied in any way by communication by telephone from the quarries?—Our district here is such that the bulk of our work is within a radius of 2 miles or so.

1065. I was thinking of an accident that happened lately at Rhosydd quarry, where it struck me that time might have been saved if there had been communication by telephone between the quarry and the village, but I suppose that kind of thing only happens rarely?—I could not point to any particular case where there was, but certainly the sooner the doctor hears of what he has to do the better. It would of course be very advantageous for him to attend as soon as possible.

1066. You have spoken about ambulance classes for the men; do you think it would be advantageous to have nursing classes for the wives and daughters?—In my opinion nursing is very backward in this district. We have a dearth of nurses here. They have no trained knowledge, it is done by rule of thumb and instinct, and they are very backward in that respect.

1067. Would it not be advantageous if nursing classes were established among the female population?—It would, most decidedly.

1068. And would it be advantageous if cookery were learnt more?—Yes.

1069. I believe there are cooking classes, but would it be advantageous if more interest were taken in those classes?—I have referred to that in the statement I

made, because I believe there is great want of domestic thrift and economy in the district, and that there has not been sufficient support given in the neighbourhood to such classes. For instance, Mrs. Greaves did a good deal in that direction some years ago, and she would no doubt have done a great deal more, if what she proposed had been responded to, as I consider it ought to have been. Even now, from what I hear, I doubt very much whether the cookery classes under the County Council are having the support they ought to have.

1070. With regard to the want of thrift, do you think that the quarryman is a thrifty man or otherwise?—As regards the quarrymen as a class, I believe they are thrifty, steady, and industrious.

1071. What about their wives and daughters?—I believe there is a defect there to some extent.

1072. Do the quarrymen's wives and daughters spend too much money upon dress—spend money upon dress which ought to go into the husband's stomach?—I believe that the great curse of the day is that so many cheap articles of apparel are sold, and that the quarryman's money goes a good deal in that way. Such articles have to be bought often, instead of buying one good article that would last.

1073. I am not throwing stones at the quarryman specially, but it is a fault that one meets with in all classes; is it apparent in the quarryman's family?—With regard to that, I cannot say that they are particularly extravagant, but I am sure I could myself prescribe more useful clothing if I were asked.

1074. What clothing would you advise for them?—Flannel; I would require all to wear flannel, and woollen and ordinary cloth goods. I would not go in so much for fineries.

1075. (*Mr. Greaves.*) You have referred to the dust in the mills as being injurious to the quarrymen, and calculated in some measure to affect their lungs?—I stated that I believe it to be deleterious to their general health.

1076. Can you instance any particular case in which such an effect is positively traceable to that cause?—No, I think I have stated that I never had such a case. It cannot be proved absolutely without a post-mortem examination of the lung, and I have never known of a case where that has been done with that view in our neighbourhood, but I have a strong opinion that such cases do happen.

1077. Do you remember the old sheds on the bank?—Yes.

1078. Which are preferable—those old sheds or the mills at present in use?—From what I have been told the old sheds did not contain quite as much dust as the mills, but I do not think there is much difference myself.

1079. The old sheds were more draughty?—They used to have them closed at both ends, and not open as in Carnarvonshire, and they closed them at either end just as the direction of the wind happened to be. The dust used to be considerable.

1080. The dust was considerable even then?—Yes, and I have been told that you could not find any difference between the amount of dust in the mills at present and in the old sheds.

1081. You made reference to the St. John Ambulance Association; have you spoken to any of the men with regard to the "first aid" instruction which you said you would give to them?—Yes, and I delivered a course of lectures some years ago, and I had the pleasure of learning from Dr. Hughes, the examiner, that 30 of the pupils passed out of a total of 33.

1082. There have not been lectures given regularly?—Dr. Jones, my partner, gave lectures as well, and also my brother at Festiniog, but that was mostly in connexion with the railway men rather than with the quarrymen. There has been no application from the men themselves for us to deliver lectures to them. Of course, if we had known there was a desire for them, we should have arranged for a course of lectures.

1083. Have you been asked to deliver lectures by the owners?—No, we have not. My impression is that the present course of lectures as prescribed by the St. John Ambulance Association is too extensive, and that it would be better if we were to give a lecture now and then, say, upon the stoppage of bleeding and the mode of bandaging, and the way to put up a fractured limb or any injury of that kind that would require support. These are really the chief things that a quarryman has to contend with, and he ought to be as thoroughly trained in those matters as possible. I remember when the first course of ambulance lectures were given, when we gave the men full instructions and they were put through everything as regards bandages and splints and so on. Afterwards, when a man had a cut, say, on the back of his hand he would come to you with his hand bandaged on a splint. The thing was overdone, showing that the men misjudged the occasions for using those things.

1084. Then they erred in the right direction?—Yes; some carried it too far, which tended to bring the whole thing into disrepute.

1085. (*Mr. Greaves.*) There is no doubt it would be an immense benefit to the district if the lectures were better organised?—Yes, it would undoubtedly, and I should always give it my best support, and do all I could.

1086. (*Mr. Jones.*) I should like you to explain a little more fully than you have done the present system of medical attendance. You say that the system of medical attendance is advantageous to the men, but to my mind you have not quite cleared the matter up?—In this way: there is no tendency amongst the quarrymen to delay calling in the doctor, and every illnes in the family is seen to at the commencement.

1087. Then they do not let their illness go too far, and you think they run to you rather too soon?—Yes, I believe that thoroughly. I believe we do a tremendous amount of overwork that we would not have to do on a different system, but of course that is to the advantage of the quarryman. I mention it, but of course I do not complain of it.

1088. So really there is an advantage there to the working man?—Yes, and I may say more. I kept an account some years ago, which meant a considerable amount of trouble and expense, as I had to get assistance for the purpose. I had books prepared with the name and residence of every quarryman, name of wife, and number of children and so on, and the illness for which any of them were attended, and I found that 75 per cent. of our work as medical men in Festiniog was in connexion with the women and children. That shows that the families get the bulk of the medical attendance, and that the men really do not require more than 25 per cent. of our attention.

1089. Was it you that attended to Evan W. Roberts, at the Votty and Bowydd Quarry?—No, it was not.

1090. (*Mr. Evans.*) Do you say that you attend to the whole of a quarryman's family for 13*s.* per annum?—Yes, we do, that is to say, the quarryman, his wife, and all children under 16 years of age.

1091. Do the men get any relief when they are ill from any source by paying that money; do they receive any weekly allowance?—No, not out of that 13*s.* per annum. That is exclusively for the medical men.

1092. Have the men clubs generally to depend upon when they are ill?—Yes, they have, and many of them have three clubs. In most of the quarries there is a sick and accident fund, and the men receive 6*s.* and 7*s.* a week. Many of the men, in addition to that, are either Oddfellows or Foresters or Rechabites, and many of them insure as well. Many of the men, when they are disabled, get from 17*s.* to 18*s.* and even 1*l.* a week.

1093. From the general surroundings of a quarryman's occupation do you think that if a post-mortem examination were made of the lung of a quarryman you would find it affected by the slate dust; is that your impression at present?—Not upon every lung, but there are some cases which I have met with in which I should say "I believe if I could see that man's lung I should "find evidence of the effect of dust upon it," but I have never had the chance of making an examination of that kind.

1094. Do you say that science would be assisted if you could make a post-mortem examination of the lung of a quarryman who had been suffering from phthisis?—Certainly, and I should like to see the prejudice against post-mortems done away with generally.

1095. Do you consider it most important that a post-mortem should be made?—It is as important as this, that it is through the practical knowledge gained through post-mortem examinations that our profession has gained the information it has. Pathology is the basis of the practical knowledge we have gained.

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1096. I think you said the principal cause of accidents to the quarrymen now is the slipping down of pieces of rock?—Yes, that is so, something on the forebreast of the rock. Our slate beds in Festiniog dip at an angle of 30° or 40° or 50°, and any stone getting loose is bound to come down with great force.

1097. And from your experience you think that is the principal cause of accidents?—Yes, speaking generally, that is so, as regards fractures and general injuries of that kind.

1098. And I believe that is called "a fall of ground" generally, is it not?—Yes, I believe it is, a slipping of blocks along the forebreast in contradistinction to falls from the roof.

1099. I do not think they are so distinguished in our tables?—We distinguish them in that way.

1100. (*Mr. Jenkins.*) Is there any doubt whatever about the unhealthiness of all dust-inhaling occupations?—No, there is not.

1101. Therefore you do not require a post-mortem examination to prove that fact?—You mean that fact alone?

1102. Yes, that all dust-inhaling is unhealthy, and produces phthisis?—No, certainly not, from a general health point of view; but you must have a post-mortem to prove that a man has died from any particular disease through the effects of dust—say phthisis. In the case of stonemasons they have found evidence of the presence of stone-dust in the lung. I have got a section of a stonemason's lung here now.

1103. Do you contend that it is possible for the dust not to go to the lung if it is inhaled?—Yes, I do, as regards the Festiniog slate. I have already said that the irritating quality of dust depends upon the amount of silicious particles in the dust. Of course you have it in the granites, whereas in the Festiniog slate quarries, as they work them for roofing purposes, it is otherwise.

1104. Therefore you rather disagree with the quotation you gave in the paper you read some time ago, in which you mentioned that Dr. Alridge states that even the particles of flour will mix with the moisture in the bronchial tubes, and form a sort of clay, and therefore clog instead of injuring the tubes and develop *emphysema*?—No, I refer now particularly to phthisis; but as regards slate dust I have been writing to Dr. Arlidge that I class the slate quarrymen in the same class as the miller. I regard the action of slate dust as resembling that of flour, in the absence of silicious particles. At the same time I believe there are cases in which slate dust gets into the lung, if we had only the opportunity of proving it.

1105. But the mortality from slate and stone dust is considerably higher than it is from flour?—Yes, but I think if you take Dr. Ogle's figures he includes masons, who work in hard stone, such as granite and sandstone, which latter is nearly all quartz.

1106. Does Dr. Ogle include pneumonia in the diseases of the respiratory organs?—Yes; it is eminently so.

1107. And pneumonia is very prevalent here?—Yes, it is.

1108. Is it more prevalent than any other disease?—It is amongst the quarrymen.

1109. Is there any danger of the irritation produced by the inhaling of slate-dust developing into pneumonia?—No, not into pneumonia, as I suppose you are now thinking of. If you are thinking of the disease we call pneumonia, we look upon it as a kind of fever, or blood-poisoning. The irritation sets up a kind of chronic inflammation leading to phthisis, and not to pneumonia as a fever.

1110. To inflammation of the lungs?—We look upon that as a fever, like scarlet fever. The man takes a chill, and the blood gets into a poisoned state, and we regard it as a fever, the same as scarlet fever or measles.

1111. And it always requires a chill before it sets in?—Yes, we always inquire whether there has been a chill, and almost always find it in such cases. When the silicious particles get into the lung they remain there and cause irritation. This sets up a kind of local inflammation to start with, a state of slow inflammation of the lungs, which develops ultimately into what we call the fibroid phthisis, which is peculiarly the state of the ungs of those who die from phthisis produced by the nhalation of dust.

1112. Have you taken any special notice of the miners as a class; do you know their mode of working underground, and do they suffer a great deal from inhaling dust?—I think I remarked in a paper of mine which appeared in the *Geninen* that we see comparatively few cases of emphysema or the miner's asthma among our quarrymen. We find very few cases here compared with other mines where the men work in harder rock.

1113. What is your experience of the healthiness or unhealthiness of the occupation of the slate quarryman compared with that of the agricultural labourer?—I have no figures to go by, as I have not gone into statistics on that point, but I think I should prefer being an agricultural labourer myself.

1114. Then you think it a healthier occupation?—Judging from the surroundings of the agricultural labourer and the chance he has of getting a more substantial diet than the quarryman, one would expect him to be healthier, but of course he has his drawbacks such as long hours and so on.

1115. Have you ever noticed any of those agricultural labourers after they have come to work at the quarries; what would be the effect upon them of working for some time underground or in the mills?—I think they generally lose their colour in a year or two. We do not meet with very many people in Festiniog who are what we call robust and plethoric—men who are full of blood and who require bleeding when they are taken ill. As a rule, the diseases assume a low type requiring stimulants.

1116. I think you suggested in your statement that a good meal after the quarrymen return home in the evening would be better than a good meal at mid-day in the quarry?—Yes, under the circumstances in which the quarrymen are placed. It is generally the case that they cannot have a proper mid-day meal at the quarry.

1117. A cup of tea would do very well at mid-day, provided it is well made?—Yes, it ought to be made properly. It should not be infused for more than five minutes. By the present mode of preparing it, it loses its volatile oil and its stimulating property.

1118. Would the rule as to the five minutes apply if you were to make a kettle full of it?—It would not make any difference at all, no matter how much you make.

1119. Would it infuse in the same time, no matter how large the quantity?—Yes, exactly the same. I believe that tea ought only to be infused for five minutes, and that it ought afterwards to be drunk there and then. It is not only a stimulant but a nutrient, and it retards the waste of the tissues of the body.

1120. In your opinion, does it make any difference whether he takes a good meal after getting home or at mid-day?—I would prefer a good meal after reaching home in the evening, rather than take it at the quarry at mid-day under the present conditions. The quarryman has time to eat it properly in the evening and to take a rest afterwards, instead of eating it in a hurry, as he would have to do at the quarry, and go to work immediately afterwards. When the men do take a meal of that kind after reaching home they ought to rest a bit, and not rush off, as too many of them do, to a committee or meeting of some kind.

1121. (*Chairman.*) You say that pneumonia may be regarded as a kind of fever—that it is a specific poison; is that so?—Yes.

1122. Is there a germ?—Yes, there is.

1123. Is the germ supposed to be brought by any winds, or how?—It is just the same as the germ of influenza, and other infectious diseases, but some suppose the pneumonia bacillus, together with others of the same nature, live in the air-passages and acquire a special vitality during pneumonia. My partner, Dr. Jones, wrote his M.D. thesis on "Contagious pneumonia," and we have had epidemics of pneumonia in Festiniog which were contagious in the same way as influenza. There is supposed to be a pneumonia bacillus.

1124. Could the quarryman preserve himself to a certain extent against the ill effects of dust by keeping his mouth shut and breathing through the nose?—Certainly. The nose, I should think, has been intended by nature for use in that way.

1125. (*Mr. Greaves.*) As a natural filter?—Yes.

1126. With regard to the question of dust, which do you think the most injurious, the slate dust met with

in the slate quarries, or the dust met with by the wayfarer in the streets of a large city?—That is a matter of the continuance of the dust. The quarryman is continually inhaling it.

1127. But there are continual wayfarers?—Yes, quite so, but you do not always get dust in that way. The ventilation in the mills is, of course, ample, but still they are always in dust there, and you do not meet with that state of things in the streets.

1128. But what about the quality of the dust?—I would rather have the slate dust than the road dust, provided I had equal quantities of both and that I had it for the same space of time.

1129. (*Mr. Jones.*) Can you tell the Committee the difference between the slate rock and, say, the granite, or any other rock?—It is just the same as in the case of iron and wood, and so on. They all have their average temperature.

1130. But with regard to dampness, the quantity of water in the slate rock compared with the others. Have you made any calculation on that point?—No, I have not; but if you sit on a piece of slate rock you will see the dampness around you on the slate, created possibly by the condensation of the perspiration by the coldness of the slate.

1131. And I suppose you consider that underground workings are more liable to damp than open workings; you would be more liable to get damp there, by droppings, or in some other way, than in the open quarry?—Certainly. We often see that the chambers have a good deal of moisture at certain times. They are often actually bedewed with moisture.

1132. You do not know that the slate rock, for instance, is three times as damp as granite?—It may be, but I cannot speak as to that. There is one point with regard to phthisis which I would like to mention. The fact of less phthisis prevailing among quarrymen may be due to their being picked men, and also to their being, as a class, sober. It is the exception for any of them to die from disease produced by alcohol. We find there is a great deal of recuperative power amongst the quarrymen, because they are generally a healthy and an abstemious class of men; but, speaking of them generally, they are slightly below par. The rate of mortality may not be higher among the quarrymen than among any set of men of equal number, but the fact remains that only 102 deaths from phthisis in quarrymen were registered for the 10 years from 1876 to 1885, and 73 deaths from the same cause during the last 10 years, thus showing a decrease of 29 cases.

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1133. (*Mr. Evans.*) If there are any deaths amongst the quarrymen from the inhalation of dust, are they included in the number you have given us?—In regard to the respiratory diseases, I calculate that 50 per cent. of all the diseases we have to attend to are diseases of the respiratory organs.

1134. And if there are any cases the same as the miller, they are included in your account?—Yes, they are included in that.

1135. So the diseases of the respiratory organs are not outside your calculation?—No, they are not. The constant inhalation of dust causes a mechanical obstruction, and entails an extra amount of work upon the mucous membrane of the bronchial tubes in casting it out. If the particles enter the lung, there is no doubt they make it more susceptible to local inflammation, and although one cannot bring conclusive evidence of the direct effect of the inhalation of dust upon the lungs, it may safely be inferred that it contributes to bring on diseases of the respiratory organs.

1136. Do you include quarrymen of all ages in the figures you have given?—All over 14 years of age.

1137. They do not begin now much under 14, do they?—I think that there are only about 70 boys admitted annually to the quarries under that age at the present time. I am certifying surgeon for the quarries, and I do not pass them unless they are up to the mark. I have from time to time refused to certify many boys, and have recommended them to go to other occupations, because I thought they would not be strong enough for the quarries.

1138. Have you any account made as to those outside the quarries who have died of consumption?—No, I have left that to my partner, Dr. Jones. I must look to him as an expert in such matters, and one who is well qualified to prepare statistics on the subject.

1139. You have compared the dust of the slate mill to the dust of a flour mill. Is the dust in a slate mill anything like that of the flour mill; is the flour mill not very much dustier?—Yes, but the dust is finer and less irritating.

1140. But with regard to the quantity, are not the number of particles floating about in the air in the flour mill very much greater than the number of particles in a slate mill?—Yes, one would suppose so owing to the comparative fineness of the flour dust. I should think the coal mine dust would be more like the flour dust than the slate dust is. The slate dust is coarser than the other two.

1141. Being of a harder material?—Yes, I should think so.

Mr. William Cadwaladr Williams examined.

Mr. W. C. Williams.

1142. (*Chairman.*) Where do you live?—I live at 16, Newmarket Square, Blaenau Festiniog, since last Monday, and I lived at Beudy Mawr before that.

1143. What is your occupation?—I am a rockman at present, but I have also worked as a slate maker.

1144. How long have you worked underground?—For over 40 years.

1145. Have you worked underground during the whole of that time?—For a part of the time I worked above ground on the rock.

1146. How many years have you worked underground?—For about 35 years perhaps.

1147. At what quarries have you been working?—At the Oakeley Upper quarry, the Cwmorthin, and at the Wrysgan. I have worked at the Oakeley Upper quarry most of that time.

1148. And are you working there at the present time?—Yes.

1149. Can you give us any suggestions for ensuring the safety of the workman, or rendering him less liable to disease?—I have not thought of anything in particular. A great many improvements have been carried out of late years, and during my time things have changed a good deal for the better. There are men who have greater ability and more leisure than I have to consider these matters, and suggest further improvements, but I am prepared to answer any questions.

1150. What do you think are the accidents that have to be guarded against mostly?—I do not know, I am sure. I find that accidents occur frequently in every occupation at the quarries, and I am not in a position to say which is the most frequent class of accidents.

1151. Do you think the quarries are getting more dangerous as they get deeper?—I believe they do, as the earth, like everything else, suffers from the effects of damp. When you open a top floor, and go down to another floor, the water percolates and makes the top more liable to fall.

1152. Do you think the rocks in the lower levels are less firm and solid than in the levels above?—No, they are more solid. The rock becomes more solid the deeper you get into the earth.

1153. Do you think that any of the pillars are being cut away improperly now, and left too thin?—I am not aware that anything of that kind is being done. I have not thought of looking into that matter. My belief is that everyone at the quarries does his best to ensure the safety of the men. Of course, I can only speak with regard to the quarry I am working at. I have not been round the other quarries at all.

1154. What about the privy accommodation at the quarries, is it sufficient?—There are some privies at our quarry, but only a few.

1155. Is there any accommodation of that kind underground?—No, there are only the places that have been worked out. We generally go to these places and use them as privies.

1156. You generally go out, do you?—Yes, we do.

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1157. Have you found the air of the underground chambers rendered impure, or have you noticed any smells arising from these places that you go to, or that some of the men go to?—It must be a nuisance to those who are near it. That is a well-known fact.

1158. (*Mr. Greaves.*) Are you aware that there are special rules in force at the quarry you work at?—Yes, there are.

1159. And have you ever read those rules?—Yes, and I have had a Welsh copy of the rules in my pocket these last days. I should like to say, with regard to these rules, that we consider them too stringent in some respects. I have worked so many years without them that it is almost impossible for me to keep to them, I consider that they are too exacting, and that it is very difficult to observe them in all particulars.

1160. If those special rules are carried out, do you consider that all would have been done that could be done to ensure the safety of the men?—I cannot think of anything better myself. I do not know whether it is right to fine us for not carrying out all the rules in their strictness. I do not think the agents ought to be so very exacting, and fine us for not observing all the rules. Is it not possible for us to avoid going under some of these rules?

1161. In the event of any machinery being out of order, or any rock becoming dangerous, do you immediately communicate with the officials of the quarry, and inform them of the defect?—Yes, we do that at once. I consider that unless we tell them we are not in our proper senses. I myself would not think of working under what is dangerous, and I have never seen anyone who expected me to do so.

1162. And do the officials always attend to your complaints when you do make them, and remedy what is defective?—Yes, that is how I have always found them. They are very willing to attend to anything to which we call their attention, and they always warn us that we are not to remain at our work if we think there is any danger. That has been my experience, and I believe it is the same in the case of the other men.

1163. As far as you can judge, is there at the present time proper supervision by the officials in the quarries?—Yes, as far as I can see, there is.

1164. (*Mr. Jones.*) Would you like these special rules to be revised?—There are some rules that I should like to see altered. There are some of them that we cannot possibly adhere to.

1165. Will you name one of them?—One of them is the rule as to the wooden rammer. If we do not use that we are liable to be prosecuted, that is, unless we use it for the first, second, and third layers of tamping. We do not require more than half an inch of tamping, because if we have more we shall spoil the block, and I do not consider that they ought to punish us in any way for not adhering to a rule of that kind which cannot be reasonably carried out. We ought to be allowed to disregard a rule of that kind.

1166. What other rule have you to complain of?—There is a rule as to the powder. An artificial light is to be placed at least 10 feet from the chest in which the powder is being kept, and that is a rule we are apt to break every day. I consider that we are in greater danger in other respects than we are when we break that rule. We pour the powder into the bugle, and take a candle with us, and we must place that candle within an inch or two from the hole into which we have to put the powder. I consider that a much more dangerous practice than the other.

1167. (*Chairman.*) Are you not allowed by the rule to put a light inside a lantern within less than 10 feet from the powder chest?—Yes, we have that permission. I do not remember what the specified distance is for the lantern, and the lantern must be closed.

1168. (*Mr. Jones.*) Why do you complain of a closed lantern?—It is sometimes very difficult for you to see clearly with the lantern, I find it is not easy to see with the lantern, especially for those who are getting old.

1169. Can you always see into the bottom of your chest when you have a lamp, or a candle in the lantern?—Yes, I can.

1170. You do not find any difficulty in seeing into the chest with your lantern?—No, we can see all the chest with it.

1171. Can you refer to another rule that you object to, or that ought to be altered?—Yes, there is another. You take powder out of the chest and put it into your bugle. If I understand the rule properly, after you have finished blasting, and if there is any powder left in the bugle, you have to take it back to the chest, and you are not allowed to keep it in the bugle. If any powder is left in the bugle in that way, we are liable to a prosecution. We have to go down the fore-breast, and take back to the chest, which is a long way off, whatever powder we may have left, although we may have occasion to use it in a very short time afterwards. There is no permission to put the powder anywhere except in the chest.

1172. You mean the remainder of the 4 lbs. bugle?—Yes.

1173. Have you another rule that you would like to refer to?—I do not remember at the present moment.

1174. Do you complain of any rule being too loose, you have complained of three or four being too stringent?—No, I find them all too severe, as far as I am concerned.

1175. (*Mr. Evans.*) You have worked for 40 years in the quarry, on the rocks?—Yes, and more than that.

1176. You worked as a quarryman before that?—Yes, for some years before that. I do not remember how many. I have been working in a quarry altogether for 52 years.

1177. How soon after a man has been taken on as a rockman do you think he is able to take charge of a bargain?—I cannot say, some men learn three times as quickly as others. It depends entirely on a man's ability.

1178. I understand that a great many labourers are taken on as rockmen after being in the quarry for some time?—There are some who are taken on in that way, in fact a great many are taken on to work by the day.

1179. Do these men not make up a large proportion of the rockmen at present employed in the Festiniog quarries?—I do not think a large number are taken. First of all they have to be with the waggons for a long time, and they are able to become familiar with the work in that way. In my time many slate makers have gone to work on the rock, because rockmen are more scarce than slate makers. I could name dozens of them.

1180. Are these men put under the care of a practical rockman for some time afterwards, before they are allowed to take charge of a bargain?—Yes, they are, for a long time.

1181. For what length of time, as a rule?—For years in many cases; I have never known a case where they have been less than two or three years. Of course I am only speaking from my own experience, but I do not know of any who have been less than two or three years.

1182. Are you satisfied that there have been no accidents whatever in consequence of such men having been entrusted with work on the rock?—No, I do not say that. The man who is in charge sees to that, if he is any sort of a man at all. There is a bargain-taker for every bargain, and the care and responsibility are laid upon him chiefly.

1183. Do you consider that a bargain-taker is responsible for keeping his bargain in a safe state after taking it?—He ought to be, or he is a very foolish man if he does not, because something may come down upon him at any time.

1184. But does he see to that?—I do so at any rate. I order them to take down everything that is loose, and to test every piece of rock carefully when I think there is any danger.

1185. In that case do you expect the managers or agents to take any notice of your bargains in the course of the month?—They do so. I am engaged at the present time in cutting the side of the pillar, and one of the managers has been asking me if I had finished the work, in order that he might go and examine the place.

1186. Do you consider, then, that it is the duty of the officials as well as yourself to see that the rocks are kept in a safe condition?—Yes, very likely it is; but when they have let a bargain to me I do not want them to interfere with me in my work until I have finished my contract.

1187. You would rather be left alone until the next settling day?—Yes, until I see the necessity of asking for their assistance, however long that may be.

1188. (*Mr. Jenkins.*) With a few exceptions you consider these rules very proper, and you think they would do a great deal of good?—Yes, I do.

1189. As a matter of fact have they done much good?—Indeed I cannot say. I know of instances where accidents have happened owing to our taking a candle too near a powder-keg. Of course the further you keep a candle from it the safer it is.

1190. Would you prefer to put your candle 10 feet away from the chest rather than place it in a lantern, and take it close to the chest?—I often leave the candle at a distance of 10 feet. I prefer it there myself, and can pour out the powder better with the candle in that position, but as a rule I light a candle, and put it in the lantern, and put the lantern far enough away.

1191. Do you consider that the 61st rule, to which you have referred—the rule as to taking the remainder of the powder from the bugle and keeping it in the chest—is a rule which it is impossible to carry out?—No, I do not think it is impossible, in fact we have to carry it out now or be fined; but it causes us a great deal of trouble and inconvenience. We have to take it a long distance, from chamber to chamber, and it very often happens that we want to use it in a few minutes afterwards.

1192. Then you consider it a very impracticable rule?—I do not consider that it is of any use at all, and I should like to see it abolished.

1193. Do you say that these impracticable rules are generally carried out?—Indeed I do not know; I cannot say anything about that, but I know that many of the men are called to account for not keeping the rules. That sort of thing happens nearly every day, and that shows that the men do not like them.

1194. You have said that if these rules were carried out nothing else would be necessary. Do you believe that if other suggestions, that would be of advantage to the men, were made that they would not be acceptable to the men?—I cannot say anything as to that at present. I do not know what suggestions could be made at all. I have nothing to suggest myself, and I do not know what suggestions others may make. I cannot express an opinion upon them until I know what they are.

1195. What are the most prevalent accidents in the quarry at present, so far as your experience goes?—I do not know indeed. I never thought of looking into the question at all.

1196. Have accidents in consequence of the men falling from one floor to another considerably decreased of late years?—Yes, I believe they have decreased considerably. Protection is provided in the shape of a fence at places where no work is carried on.

1197. Can you ascribe that to the carrying out of the special rules?—I ascribe it to the fact that the management have provided the fences. I do not know whether there is anything in the special rules as to providing these fences, but it is a very good thing wherever it is.

1198. Is it a fact that a great many accidents happen owing to falls from the top or somewhere else?—Yes, a good many.

1199. Most of them, I believe, happen in that way? I cannot say anything as to that. I have already said that I do not know from what cause the greatest number of accidents happen.

1200. Do you believe that all the men take the necessary steps to leave the sides of their chambers in a proper condition, the pillars?—I do not know whether we are as careful in that respect as we ought to be. It is from very small matters that I find accidents happen generally. When there are any big blocks that are unsafe we are careful enough with those, but we are not so careful in removing small pieces, and in course of time the small pieces may fall down and cause accidents.

1201. It was suggested at the last sitting of the Committee that a man should be appointed by the quarry management to inspect the sides thoroughly before they get out of reach, do you approve of that suggestion?—Yes, I do. They do that now at our quarry to a great extent. One of the managers always comes to test the roof with the hammer.

1202. Would you approve of that being done with every "thickness"?—No, I do not want an agent to see to that. I have to see to that myself. Do you mean every bed, as you go up alongside the pillar?

1203. Yes. You say you do not want that yourself, but there may be other men who are not as careful as you are. Would it do good, speaking generally?—Perhaps it would be a good thing for me as well. I always do my best, but I think that someone might go and inspect the place to see that it is safe.

1204. (*Mr. Jones.*) Was it to examine the pillar that Mr. Roberts, or one of the agents, wanted to come to your bargain when he asked you, as you have just told us, whether you had finished the work?—No, not specially, but to see if we were all there, for one thing.

1205. But you said just now that one of them asked you whether you were ready for him to examine something. Did you refer to the pillar?—Yes, that is what I meant.

1206. Did Mr. Roberts, or one of the agents, intend to see whether you had worked up to the pillar in a proper way or not?—We had been engaged in removing the "thickness" and had gone close to the pillar, and one of them came to me to ask if we had finished, in order that he might examine the pillar.

1207. (*Mr. Jenkins.*) Is that usually done?—I cannot say whether it is usually done or not in other places. I never go anywhere except to my own chamber, and I do not question anybody either.

1208. (*Mr. Jones.*) Do you say that bridges are better fenced, or what about the old "benches" along the pillar; have you many of them?—We have both the one and the other.

1209. Have you many of the old "benches" now?—No, we have not. Levels are cut clean through the pillars.

1210. So you have really done away with the old "benches"?—I do not know of any at our quarry, but I cannot say anything as to other places.

1211. (*Chairman.*) Can you point to any accident which has happened from pieces being carelessly left unsafe by the men in the sides of the chambers, that is to say, in the pillars?—No, I cannot recollect any just now.

1212. (*Mr. Jenkins.*) Can you say whether they were left carelessly, or whether they became loose of themselves afterwards?—No, I cannot. I do not think it is owing to any carelessness, but to the rocks getting loose afterwards.

1213. What would you do with such a place? If you could not leave it in a safe condition, what would you do?—We never work such places, and we are not allowed to work them unless they are first of all made quite secure.

1214. I do not mean that. They might be made secure at the time, but they might be liable to get loose afterwards, say, for instance, where the rock is bad, or where there are "bevels," what would you do in such a case?—We go to try them if we find bits coming down. We generally have some warning of that kind, either by small pieces falling, or something of that sort, and if we think there is any danger we examine it ourselves if we can, and if we cannot do so we inform the agents of it and get them to see to it.

1215. Is it not a fact that sometimes you cannot get a place perfectly solid? Supposing there is a place which appears at first quite safe, but which you think might become dangerous in course of time, what would you do?—A case might happen, there might be a piece of rock which would not be pulled down at the time, but would be left with the intention of pulling it down before it would get out of reach, or the agents would be informed of it.

Mr. JOHN ELLIS ROBERTS examined.

1216. (*Chairman.*) Where do you live?—At Bryngoleu, Tanygrisiau.

1217. And what is your occupation at the quarry?—Slatemaker.

1218. How long have you been employed as slatemaker?—For about 40 years.

1219. In what quarries have you been working?—I have been working for a long time in Carnarvonshire, and I have also worked at the Festiniog quarries.

1220. Have you worked above-ground during the whole of the 40 years?—No, I have worked both above-ground and underground.

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1221. Have you suffered in your health in any way from your occupation?—I have suffered from colds and things of that kind.

1222. Have you suffered at all from the effects of dust?—I cannot say for certain whether the dust has affected me or not, but I believe, judging from the spittle, that a good deal of dust goes where it ought not to go.

1223. But if you spit the dust out, do you not get rid of it in that way?—No, I do not believe that, as a good deal of it goes to a place whence it cannot be spit out.

1224. Do you suffer at the present time from any tightness of the chest or anything of that kind?—Yes, but I attribute that to a cold I contracted some time ago.

1225. Have you any suggestions that you could make to us for improving the state of things at the quarries?—I do not know that I have anything to suggest. I have not been thinking much of the matter, but it would be very desirable if something could be done to ensure better health for the men, and to further lessen the number of accidents.

1226. How do you think you could best be secured against accidents?—For one thing, I consider that the men should dress themselves in a manner suitable to the work they have to perform. To my knowledge there have been many accidents in the mills from time to time owing to the men wearing loose jackets or other unsuitable articles of clothing which get into the pulleys or machinery and result in accidents.

1227. Is there anything else you could suggest?—I would suggest that proper guides be arranged so as to move the belting properly from one pulley to the other. I remember the time when there was nothing of that kind in use, but it is used at the present time at our quarry. Formerly we had to take a piece of wood or use our hand to keep the belting in the proper place.

1228. And the present system is an improvement on the old one?—Yes, it is, undoubtedly. I can refer to an accident in my own case: Owing to carelessness on the part of the man who had to set things right I had to put my finger in a place where it ought not to have been put, and I was injured in consequence.

1229. (*Mr. Greaves.*) What is your opinion as to the special rules at present in force, do they conduce to the safety of the men in general?—I believe they do, so far as they are conformed with by the men, but the tendency is to regard them as a kind of policeman, and to try to observe the letter rather than the spirit of the rules.

1230. (*Mr. Jenkins.*) You stated that you considered the slate dust detrimental to the health of the men?—Yes, I believe it is, but I do not know whether I am correct in that or not. That is my impression.

1231. You rather feel it be injurious?—I am not enough of a doctor to say that, but I find myself better in the absence of dust than in its presence.

1232. You do not complain of insufficient ventilation where you work?—No, there is plenty of air, and perhaps too much.

1233. Is it a fact that the place is too draughty occasionally?—There is too much draught in the place where I am working, but I believe the majority of the buildings are otherwise.

1234. Does too much wind tend to raise the dust?—I think the wind removes the dust, so that the men do not inhale it, but the danger is that they take cold through not being able to keep themselves in the same temperature.

1235. Is the water supply good where you work?—Yes.

1236. Where do you eat your dinner at the quarry?—There is a building prepared for the purpose of eating in, but I eat in another place with a small number of men.

1237. What sort of a place do you eat in?—It is the place where they sharpen the saws.

1238. Do you think that is a very healthy place for you to eat in?—I cannot say, but I have not suffered any inconvenience by it.

1239. But the eating-house is a very convenient place?—Yes, it is a very desirable place, but somehow I like to be more by myself.

1240. How do you make the tea that you take at the quarry, does it stew very much?—The way the tea is prepared at the eating-house is one reason why I eat at the other place. I make my tea in the same way as they do at home. We boil the water in the kettle, and let the tea brew for a few minutes in an ordinary earthenware teapot.

1241. Do you prefer a cup of tea at dinner-time to anything else?—Yes, I find it better to work after. I used to take buttermilk with me, but I found that rather heavy and it made me drowsy.

1242. And you prefer to have your dinner after reaching home in the evening?—Yes.

1243. What about the sanitary arrangements at the quarry, are there proper privies there?—The men have to use their own common sense in that matter. There are places set aside, but I do not think they are what they ought to be.

1244. Would you recommend that proper privies should be provided?—I think they would be very desirable.

1245. What sort of clothing do the men wear as a general rule?—The general rule is to wear linen jackets and those are left in the quarry at night, and dried before the morning. If the weather is cold we wear old cloth jackets until they are worn out.

1246. Do you wear flannel?—Yes. I always do, and I believe the majority of the men do. The men who are somewhat old invariably wear flannel, but the younger men may neglect it.

1247. We may take it, therefore, that the quarrymen as a rule are very well clad?—Yes, I believe that is so, unless they spend their money upon drink or something of the kind.

1248. What about change of clothing, do the men generally change their shirts at night?—I do not think that is done.

1249. Do they wear the same shirt all through the week, day and night?—That is how I do, and I believe the great majority of the men do likewise.

1250. Do not you think it would be better if they were to change their shirts after returning from their work?—I believe that would be an improvement. It would certainly be refreshing. We have our shirts washed as a rule every week or every fortnight.

1251. Do you generally get wet as you go to work in the morning during wet weather?—That depends on the protection we have. A good many of us leave home in the morning without making any provision, and then we have to work in our wet clothes.

1252. Would you recommend that a proper place be provided at the quarry where the men can change their wet clothes?—Yes, for my own part I should like that very much.

1253. With regard to the accidents above-ground, have they, in your opinion, been reduced, practically to a minimum?—I cannot say anything as to that. I have no doubt in my own mind that they have been reduced, but I cannot speak with certainty, as I have not paid sufficient attention to the matter.

1254. When accidents occur at the sheds, from what cause do they generally occur?—It depends to a certain extent on the material we have. There are often "bevels" or joints in the slate which the men cannot see, and sharp-edged pieces come off which cut their hands. There are also the accidents I have already referred to, which are caused by the men wearing loose jackets.

1255. Do many accidents happen from the small wheel on the front of the table?—I think there is an improvement in that respect. There have been accidents from the tables in the manner you mean. At present we put an iron plate on the wheel to prevent the men from putting their feet in. In some cases we have only one bar of iron and not a wheel.

1256. That could easily be improved?—Yes, very easily.

1257. (*Mr. Jones.*) By having a plate?—Yes, it ought to be faced with an iron plate.

1258. (*Mr. Jenkins.*) So as to fill up the space and prevent a man putting his foot in?—Yes, quite so.

Mr. David Davies examined.

Mr. D. Davies.

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1259. (*Chairman.*) Where do you live?—At Rhos, Penrhyndeudraeth.

1260. What is your occupation?—Slatemaker.

1261. For how many years have you been a slatemaker?—For 29 years.

1262. At which quarries have you been working?—I have worked at the Lower Oakeley quarry the whole of the time.

1263. We have had a great deal of evidence about dust, and we have also had evidence about tea, and about privy accommodation, or the want of it, which I have no doubt you have heard?—Yes; I have.

1264. I do not know that we need go over that ground again, unless you have anything special to suggest to us upon these matters, or have you suffered any inconvenience yourself that you would like to bring to our notice?—No; I have nothing else to add on those subjects.

1265. (*Mr. Jenkins.*) Do you agree with everything that was said by the previous witnesses?—I cannot say as to every single question.

1266. (*Chairman.*) Have you suffered in any way yourself?—I cannot say that I have; I have enjoyed very good health all my lifetime.

1267. Have you anything to suggest as to accidents, and the means of preventing them?—Every accident that I have known of can nearly always be traced to absent-mindedness on the part of the men.

1268. To inadvertence?—Yes.

1269. I see that you live at Penrhyndeudraeth?—Yes; I do.

1270. Do you travel backwards and forwards every day by rail, or do you live in barracks during the week, and return home on the Saturday?—I have been going home daily for the last 10 or 12 years.

1271. How long is it since the Festiniog Railway Company have given up the carriages which had no doors, and which were open at the side?—I cannot say exactly, but it is about six or seven; or perhaps eight years ago.

1272. Did the men who travelled in those carriages suffer in their health, do you think?—Yes; they did undoubtedly. The old carriages were very cold,—in fact, they were not fit to be called carriages at all. They ought to have been called boxes.

1273. But those have been done away with now?—Yes; they have other carriages now, and in some respects they are very good; but as a general rule they are overcrowded.

1274. How do you mean?—They put 16 men in each carriage; and there is not sufficient room for anything like that number.

1275. Is there a notice in the carriages which states the number of men they are allowed to put in?—No; there is nothing in the carriages to that effect. We had some correspondence with the company about the matter when these carriages were first of all introduced, and the secretary practically told us to mind our own business, although not in those very words.

1276. Do you think that matters could be improved by having a proper supply of carriages to take you up and down?—Yes, that would no doubt be an improvement; I do not consider that they are properly constructed. They place the benches or seats around the carriages, instead of across, and four men in each carriage must sit with their back to the window, and this in my opinion is a very improper position for the men to sit in. It is also very dangerous.

1277. (*Mr. Greaves.*) You are talking now of the Festiniog Railway?—Yes, I am.

1278. I suppose you are aware that there are special rules in force at your quarry?—Yes.

1279. Can you suggest any improvement or amendment in those rules?—No. I feel that they are very strict rules and very good ones.

1280. Then you approve of them on the whole?—Yes.

1281. Do you work in the mills?—Yes.

1282. If you see anything wrong I suppose you report it to the officials?—Yes, always.

1283. And they always see to it at once?—Yes, so far as I know, they do.

1284. (*Mr. Jenkins.*) Have you any suggestions to make with the view of lessening the danger to health from the inhaling of dust?—If it could be lessened it would be a very good thing, whether it is dangerous to health or not. There is a good deal of dust in summer. I believe there is more in summer than in winter, or at all events we see more of it. There is one thing which I believe would lessen it a little, and it is in use in some places. Some of the mills are provided with a door where the waste from the slates falls from the dressing machines, and if these doors were adopted in every mill it would be a great improvement, in my opinion.

1285. (*Chairman.*) There is a door that prevents a draught going to the machine?—Yes, it prevents too much draught.

1286. There is a shutter to close the place up?—Yes.

1287. (*Mr. Jenkins.*) And you consider that an improvement?—Yes, I do.

1288. It has been suggested that there should be a gentle spray brought to play on the dust; what do you say to that?—It would keep the dust down. I have been watering the place myself when it is very hot in summer. I have been watering the place all round with a pail of water, and I found it very useful.

1289. And you think it would be well to water it generally?—Yes, I do.

1290. What is your opinion of the dual inspection of the quarries at present in force?—I do not quite understand the question.

1291. At present you are under two inspectors, one under the Metalliferous Mines Acts and the other under Factory Acts; what do you think of that system?—I have not paid much attention to the matter, and therefore cannot express an opinion.

Mr. Owen Rowland Jones examined.

Mr. O. R. Jones.

1292. (*Chairman.*) Where do you live?—At 7, Newborough Street.

1293. And what is your occupation at the quarry?—Slatemaker.

1294. How long have you worked at the quarries?—For about 18 years.

1295. And have you worked the whole of that time above-ground in the mills?—For the first 15 years I worked sometimes in and sometimes out, and for the last three years I have worked in the mill altogether.

1296. Have you any suggestions to make to us?—Since this Committee was appointed the workmen have had a meeting to consider the matter, and Richard Griffiths (the next witness) and myself have been requested to attend to lay the following suggestions before you:—

1. *Under-ground dangers.*—(*a.*) We recommend that no work be commenced in a new chamber until the inspectors of the company certify it as a safe place to work in.

(*b.*) That periodical inspection be made of every chamber in the mines, and that a record of the same be entered in a book which may be seen by the Government inspector whenever he wishes. We ask for the inspection because we are of opinion that the mines become more dangerous the deeper they descend into the earth, and this opinion is confirmed by the fact that the number of fatal accidents caused through falls of rock have increased during the last 10 years from 32 per cent. to 48 per cent.

(*c.*) That some plan be adopted to prevent the water from trickling down the fore-breast of the rock, which makes the ropes and the surface of the rock itself very wet. This makes the man's body also wet. We consider the mischief could be avoided by making dams.

(*d.*) That a wall be built in the middle of disused levels instead of fences, as is the case at present.

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(*c.*) That there be some effectual provision to regulate the wheel of the crane.

2. *Inspection.*—(*a.*) That the area under the inspection of the Government inspector is too great, which makes his visits too infrequent.

(*b.*) That we ask the Government to appoint a sub-inspector possessed of practical knowledge, and a knowledge of the Welsh language.

(*c.*) That the inspector should have an account of the accidents from the workmen apart from the agents. What we mean there is this: When an accident happens Dr. Foster, the inspector, visits the quarry, and he is always accompanied by one of the agents, who, if necessary, acts as interpreter between Dr. Foster and the men. If the accident has been brought about owing to the carelessness of an agent I do not think the present mode is the best one for getting at the truth.

3. *Sanitary Laws.*—(*a.*) That suitable eating-houses be provided. (*b.*) That waterclosets and a better supply of water should be provided.

4. *Inquests.*—(*a.*) That it would be desirable to have among the jury persons having a practical knowledge of the occupation of the person concerning the circumstances of whose death an inquest is being held. (*b.*) That more care be taken to ensure accurate evidence. The jurymen at inquests, under the present system, are made up of shopkeepers and other tradesmen, who are not familiar with the terms in use in the quarries. In our opinion, these men cannot possibly grasp the facts of the case, as those familiar with the occupation could. I may say that it was stated at the meeting at which these suggestions were framed that several fatal accidents had happened in the Festiniog quarries, and that when the inquests were held the man or men who first saw the deceased after the accident were not called to give evidence.

1297. (*Mr. Greaves.*) Can you speak as to that fact yourself?—No, I cannot personally.

1298. (*Mr. Evans.*) Can Richard Griffiths (the next witness) speak as to that?—I do not know whether he can or not.

1299. (*Mr. Jones.*) Do you know who made the statement at the meeting?—No, I do not.

1300. (*Chairman.*) You say that at the inquest the first person who came to the man after the accident was not called as a witness?—Yes, that was the statement that was made at the meeting, and it was given as one reason why we should call the attention of the Committee to the question of inquests.

1301. But you cannot mention any particular case, you say?—I do not like to do that, for fear I should make a mistake.

1302. Is there anything else that you can think of?—There are also some complaints from the mills. First of all the men complain as to the dust, and of the want of privy accommodation, and also as to the drinking water. As Dr. Roberts mentioned in his evidence, the men who work in the mills are very thirsty, especially in the summer, and it is very important that they should have water that is fit to drink. We also consider that the mills ought to be put under the same inspection as the under-ground workings in the quarry.

1303. Have you any other suggestion to make?—No, I have not.

1304. How many workmen do you and Mr. Richard Griffiths represent?—I should like to explain that. Notice was sent to every quarry asking them to send delegates from above-ground and under-ground to a meeting to be held to consider these matters. I cannot say how many men were present at the meeting. I attended the meeting because I had been selected by the men of the Oakeley Middle quarry.

1305. Do you consider that you and Mr. Richard Griffiths represent the feeling of the men employed at the Middle Oakeley quarry?—Yes, I do.

1306. (*Mr. Evans.*) And besides the men from the Middle Oakeley quarry, you say there were men present at the meeting from the other quarries in the district?—Yes.

1307. (*Mr. Jenkins.*) How many quarries were there represented at that meeting?—There were representatives from the Llechwedd, the Votty and Bowydd, the Cwmorthin, and the Upper and Middle and Lower Oakeley quarries. I am quite certain of these, but there were also many men present whom I did not know.

1308. (*Chairman.*) Were there men there from all the principal quarries in the district?—Yes.

1309. Were there any from Maenofferen?—I am not quite certain of that.

1310. At any rate, you represent a very large number of men?—Yes.

1311. You do not say that you represent all the men in each of the quarries that you have named?—I represent the slatemakers of the Middle Oakeley quarry, and I put these suggestions before them, or rather they gave me the suggestions and requested me to lay them before this Committee. I ought to explain that I was only asked to tender evidence concerning the mills at the Middle Oakeley, and not the under-ground workings.

1312. (*Mr. Jenkins.*) Have other men been appointed to represent that committee meeting and to give evidence here?—Several of the members of the Committee are to attend here. They have been appointed by the workmen in the different quarries.

1313. With regard to these points that you have brought before us, the men consider that periodical inspections should be made of every chamber in the mines?—Yes.

1314. At what intervals do you think that these periodical inspections should be made?—They should be made at intervals of six months at least.

1315. The men say that they ask for the inspection, because they are of opinion that the mines become more dangerous the deeper they descend into the earth. Why do you think the danger increases as you go down?—The top gets to be heavier, and both time and the weather affect the rocks.

1316. (*Mr. Greaves.*) You mean in the old workings?—In the whole of the quarry.

1317. Do you mean the worked-out parts, or where they are working now?—Every part of the quarry in the lower workings gets more dangerous.

1318. Do you mean that the ground gets looser?—The pillars get looser.

1319. In what way do they get looser?—There is more weight on them, and as they open to daylight, as they have done at the Oakeley, the weather affects them.

1320. It affects the *bôn*?—It affects the pillar.

1321. Lower down or near the surface; at the bottom or at the top?—It affects the top and bottom. I wish to explain that I do not work in the pit, but I merely lay these suggestions before you on behalf of the committee.

1322. (*Chairman.*) With regard to the question of the Welsh language, is it not a fact that a great many of the men understand some English?—No, not very many, I think. I should like to add, that the committee I represent consider that the increase in the number of accidents through falls of ground during the last 10 years, from 32 per cent. to 48 per cent., is an important matter, and that it ought to be taken into account by this Committee.

1323. Those deaths from falls of ground include slipping down of fore-breast, and you may not be aware of that. For instance, in the case of the man at Rhosydd the other day, a large quantity of rock fell down upon him, and not a piece from the roof or pillar. Deaths caused by the slipping away of the ground while a man is in the act of removing it, are included in the figures you quote, so that your figures do not prove that there is an increase in the number of accidents from falls of roof and pillar.—That may be, but I thought it was otherwise.

1324. (*Mr. Greaves.*) I suppose the agents do go round to inspect sometimes?—Yes, they do.

1325. But you cannot say from experience, as you do not work under-ground?—No, I cannot.

1326. (*Chairman.*) Above-ground, you think it is desirable that eating-houses should be provided?—Yes.

1327. Are those not provided at the Oakeley quarries?—We have one on the floor where I am working, but there is only accommodation for about 56 men.

1328. Is there sufficient accommodation for everybody?—No. There are about 150 working on that floor, so that there is only accommodation for about one-third of the number. Some of the men go to the place where they sharpen the saws, and in my opinion that is a very unsuitable place.

1329. (*Mr. Greaves.*) What is there provided in the eating-house?—A stove, and a table and benches.

1330. Is there hot water?—The company provide coal, and we pay for cleaning and for lighting the fire.

1331. Can you suggest anything else that might be provided with advantage in these dining rooms that are not now provided?—No, I have nothing to suggest.

1332. (*Chairman.*) Do I understand that you wish for more of those houses?—Yes, we want more of them. There is only room for 56 men out of 150.

1333. (*Mr. Jenkins.*) Do you suggest that these eating-rooms should be provided generally at all the quarries?—Yes.

1334. They are very comfortable places as they are?—Yes.

1335. (*Chairman.*) Have you any experience of the barracks?—No, I have not.

1336. (*Mr. Evans.*) With regard to the appointment of a sub-inspector, what benefit do you expect from that?—A man who has practical experience, and who has worked in the quarry himself, ought to be appointed. He could get at the circumstances of the men and their work better.

1337. Do you consider that the great dangers of the quarries are hidden from the man who has no practical knowledge?—Yes, I believe they are. He cannot possibly see and understand things as the practical quarryman can.

1338. With regard to the Welsh language, do the men, as a rule, find a difficulty in speaking to Dr. Foster?—Yes, that is certainly a disadvantage. The agent is the interpreter as a rule between Dr. Foster and the men, when he visits the quarry.

1339. And you think that is not quite fair?—I believe it would be better if he could ask his questions in the language of the men. I should like to add that the drinking water ought also to be seen to It is very essential we should have a proper supply. The water we have at our quarry is such that the manager has warned us not to drink it without boiling it.

1340. (*Chairman.*) What water is it that you have to drink, where does it come from?—I believe it comes from the reservoir in the upper quarry.

1341. (*Mr. Jenkins.*) You say the supply is defective?—Yes.

1342. (*Chairman.*) Was the occasion when you were asked to boil the water a time when the reservoir was nearly empty, and there was great drought?—I have never seen the reservoir, but I know it was in the summer when we were told to boil it.

1343. (*Mr. Jenkins.*) And do you think it is defective?—It is not good water at any rate. It tastes of peat.

1344. Have you any proof besides that?—No, I have nothing else, but it is quite a common thing to see bits of peat coming down in the water.

1345. (*Mr. Jones.*) What about your kettle, how does the water affect it?—I never see the kettle except when it is full of water.

1346. (*Mr. Evans.*) Did you ever see sediment at the bottom of a vessel in which the water had been standing?—I never see the kettle or any other vessel except when it is full.

1347. (*Mr. Greaves.*) Does the water come along the rock all the way?—I believe it comes along pipes.

1348. Can anything get into the water to contaminate it?—I cannot say.

1349. (*Mr. Jenkins.*) Is that the only water you have to drink?—Yes.

1350. And do the men sometimes drink it without boiling it?—Yes, they do in the summer. They drink a great deal of it in the summer months.

1351. (*Mr. Jones.*) Have you ever had occasion to use soap in it?—No, I never have.

1352. (*Mr. Jenkins.*) You have no complaint about the shed, have you?—No, I have not.

1353. What about the sanitary arrangements?—There are no sanitary arrangements of any kind at our quarry.

1354. (*Mr. Evans.*) What do you mean by the suggestion that the Government inspector should have an account of the accidents from the workmen, apart from the agents?—When an accident happens through the negligence of the agent, the men do not care to give a proper account of the matter in the presence of the agent.

1355. You mean a verbal account?—Yes. It would be rather a difficult matter for the men to accuse the agent in his presence, I mean to incriminate him.

1356. (*Mr. Greaves.*) Do you mean to say that the men want a private inquiry, without the agent being there to hear what is said?—What I should like would be to see the inspector go there to inquire directly how the accident happened, without taking the agent with him.

1357. (*Mr. Jones.*) You mean as a preparation for the inquiry of the coroner?—Yes.

1358. You are referring now to fatal accidents?—Yes, chiefly.

1359. (*Chairman.*) Is there anything else you would like to tell us?—Yes; there is one other matter. I asked the secretary of the Llechwedd quarry sick fund, as he is the only one I know of who has kept an account of the kind, for particulars of the number of men who travelled by train, and the number of men who received sick pay during the last three years. He replies that in the year 1890 that 450 Llechwedd workmen contributed to the sick fund, and in that year 109 of the 450 were on the sick list. Out of the 109, 40 were men who travelled by train, the other 62 being men who lived in the district. The large majority of the Llechwedd workmen are men who live outside the district, and who travel by rail. In 1891 the figures were:—437 contributing to the sick fund, 155 received payment from the sick fund, 68 of these being men who travel by rail, and 87 men who live in the district; in 1892, 431 contributed to the sick fund, 115 received money from the fund, and out of that number 44 travelled by train, and the remaining 71 lived in the district.

1360. (*Mr. Evans.*) Can you tell us how many of the Llechwedd men live at Festiniog?—The great majority of them leave by train every night.

1361. You cannot say the number?—No, but the great majority live outside the district.

1362. (*Chairman.*) Do those figures show that the men who travel by train are more liable to sickness than those who live in the district?—No, it is quite the other way. In spite of the fact that the great majority of the men at Llechwedd travel by train every night, only 152 of those were on the sick list in the years 1890, 1891, and 1892, as against 227 of those who live in the district.

1363. (*Mr. Greaves.*) Then those that go away by train are the most healthy?—Yes.

1364. (*Mr. Jones.*) Or they do not send in their claims for sick pay?—That is not very likely.

1365. (*Chairman.*) What proportion of the number were in respect of accidents and illness?—I do not know. There is no account of it.

1366. Some might be accidents and some illness?—Yes, that would be so. I am simply giving you the figures as I got them from Mr. Daniel Williams, the secretary of the sick fund.

1367. Up to 1880 you had an inspector who spoke Welsh; do you think that the inspection is less effective now than it was before 1880?—It is quite the contrary.

1368. (*Mr. Jenkins.*) Is any objection felt to the inspection of Dr. Foster?—No, it is quite the other way, as far as I understand the feeling of the workmen. That is certainly my own feeling.

1369. Your only suggestion is that a sub-inspector should be appointed who has a practical knowledge of quarrying and a knowledge of the Welsh language?—Yes.

1370. Could you get a man possessing those qualities and possessing the other qualities also?—My opinion is that you cannot get in one man all the qualities that are necessary in a suitable inspector.

1371. (*Mr. Jones.*) So you want an additional inspector under Dr. Foster?—Yes, practical as well as scientific knowledge is required.

1372. You say you received the figures as to the sick fund at Llechwedd from Mr. Daniel Williams, the secretary?—Yes.

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1373. Do you think he would have any objection to attend here to give evidence if asked by the Chairman?—I do not know, indeed.

1374. (*Mr. Jenkins.*) Did you ask him to come?—I did, and he said he would not come—that the men had appointed others. He did not say anything after that. He states in a letter he has written to me that he is not coming to give evidence.

1375. What do you think of the present dual inspection of these quarries; do you think it would be better to be under one inspection?—Yes, I am strongly of that opinion.

1376. And that that inspector should be the inspector under the Metalliferous Mines Acts?—Yes, of course. There would have to be some changes in the Metalliferous Mines Acts to make them applicable to the mills.

1377. (*Mr. Greaves.*) Do you think the rules are not sufficiently carried out at present?—At our quarry they do much more than the rules require.

1378. Then do you think that another inspector would enforce these rules more strictly?—We want other rules to be framed as well.

1379. What duties do you think would devolve upon a sub-inspector?—Dr. Foster's district is too large, and his visits in consequence are not frequent enough. I believe his district extends over 14 counties, and the men consider that he ought to have an assistant, and that that assistant should be a practical quarryman and a Welshman.

1380. What part of Dr. Foster's work at present is it that is not satisfactorily done?—I have mentioned some things.

1381. What are they?—Want of knowledge of the Welsh language is one.

1382. Is there any other suggestion?—No, not as to Dr. Foster. Personally, I have no objection to him at all.

1383. But what would you suggest a sub-inspector should do?—To see that the rules are properly carried out.

1384. But have you not already said that they are more than carried out at the present time?—Yes, the present rules are.

1385. Then how can that appointment improve matters?—That is only done in one quarry, so far as my knowledge goes, but the special rules apply to all the quarries.

1386. You speak as to the way in which they are carried out in your quarry?—Yes, in the Oakeley Middle quarry.

1387. (*Mr. Evans.*) Would you include the rules which the officials of your quarry carry out, and which are not in the special rules, in any new rules that may be drawn up?—Yes, with the exception of those special rules mentioned by William C. Williams as being unsatisfactory.

1388. (*Mr. Greaves.*) And those are too strict?—They are too impracticable. I am referring now to the rules as to the tamper and the powder.

1389. (*Mr. Jenkins.*) Do you say that no man, however qualified he may be in other respects, can inspect properly unless he has had some experience himself in working in slate quarries?—Yes, I do. That is my decided opinion.

1390. Is that required in all other industries, or not?—Yes, I believe it is.

1391. Is it granted at present?—I believe it is in coal mines, but I cannot say anything as to other industries.

1392. When you said that more rules are carried out than are in the special rules, you meant that in their anxiety to prevent accidents they do many things that are not required by the special rules?—Yes, that is what I meant, and I wish those things to be made compulsory at the other quarries where they are not carried out.

1393. (*Mr. Greaves.*) Do you mean to say that those things are not done at the other quarries?—Yes, I do. For instance, Mr. Lloyd Jones said here the other day that they do not inspect places at his quarry unless they consider them dangerous, but they do inspect places at the Oakeley quarries periodically, whether they are dangerous or not.

1394. (*Mr. Jenkins.*) You mean by means of a Wells light?—Yes.

1395. (*Mr. Evans.*) You said at the commencement of your evidence that you would have a record of the inspection of the chambers kept in a book which might be seen by the Government inspector at any time?—Yes. I have one case in my mind now which shows the importance of that suggestion. There was an accident at the Cwmorthin quarry, and it was said that it had been stated a fortnight before the accident that the place was dangerous, but this was denied. If a record of the inspection in that case had been entered in a book at the time it was examined it would have proved that the place was not attended to after it had been examined.

1396. (*Mr. Greaves.*) Is that done in some quarries?—I do not know.

1397. But you think it ought to be done?—Yes, certainly.

1398. (*Mr. Jones.*) Do you think that the special rules should be revised, and that the workmen should have their hand in the work?—Yes, that was what we had in view in preparing these suggestions to lay before this Committee.

1399. Are you aware that the Votty and Bowydd, for instance, are not under the special rules, and that there are only three quarries under these rules?—Yes, I am aware of that.

1400. Do you think all the quarries ought to come under the same rules?—Yes, certainly.

1401. (*Mr. Evans.*) With regard to the inspection you have suggested, would you extend that to the machinery which may place the men's lives or limbs in peril?—Yes, I would.

1402. (*Mr. Jenkins.*) Do you suggest that the inspector should be appointed by the Government, or by the quarry owners?—By the Government. I consider that every quarry ought to have an inspector of its own, and that in addition to that there should be a sub-inspector appointed by Government.

1403. (*Mr. Evans.*) This periodical inspection is to be made by the man appointed by the quarry owners?—Yes.

1404. (*Mr. Jones.*) And the sub-inspector is to be under Government?—Yes.

Mr. R. Griffiths.

Mr. Richard Griffiths examined.

1405. (*Chairman.*) Where do you live?—In the High Street.

1406. And what are you?—A rockman and a slate-maker.

1407. How long have you worked in a quarry altogether?—From 27 to 28 years.

1408. For how many years have you worked above-ground?—About six years. At Bryneglwys I worked about five and a half years in and out alternately, and in Festiniog I have worked about a year outside, and the remainder inside.

1409. Therefore, the greater part of your experience has been as a rockman under-ground?—Yes.

1410. What suggestions have you to make for ensuring the safety of the under-ground workings?—Most of the suggestions I had to make have already been made by the last witness. He was the secretary of the committee of workmen appointed to consider the matter, and I was the chairman.

1411. What is your experience with regard to the chambers; do they become more dangerous, or less so, as you go deeper?—They get more dangerous as you go down. Everyone who observes at all can see that.

1412. In what way, as regards the roof or the sides?—Sometimes in both respects, but most commonly in the pillars.

1413. (*Mr. Greaves.*) Why in the pillars?—For one thing, they hold the most weight, and then the pillars have been injured from above in the blasting, and the weather also affects them. The wet and dry weather alternately tend to make the rock loose.

1414. You are talking of the sides, where the weather can get at them?—No.

1415. Under the ground?—Yes.

1416. (*Chairman.*) Do I understand you to mean that the pillar itself is less safe when you are deep down than it is when you are nearer the surface?—Yes, it is, for two reasons. In the first place, time and the weather affect the joints in it, and in the second place there is the additional weight placed on it.

1417. But do the weather and time tell upon the pillar a long way under-ground as much as they do upon the pillar near the surface?—I cannot speak definitely as to that, but the weather does affect it under-ground. There is a tendency in the slate rock to attract the water, and it trickles under-ground, and it is very seldom you get it dry.

1418. Is not the rock more solid and firm as you get deeper than it is at the surface?—There are fewer joints in it, as a rule, and the blocks are larger, but when it begins to pillar it has a more injurious effect on the rock.

1419. Why has it a more injurious effect on the rock?—When we cut the rock, especially on the eastern side, the rock generally "scribes," and if the block is 6 yards long, it "scribes" more than if it were smaller. The longer the block, the more the "scribe" is.

1420. (*Mr. Jones.*) Do you mean the eastern side of the pillar, or what?—The western side of the chamber and the eastern side of the pillar.

1421. (*Chairman.*) Does the western side overhang a little in the Oakeley quarries?—Yes, it leans to the west. We form the western side of the pillar, somewhat in step-fashion, making a step outwards after each "thickness" is taken off. Consequently each separate "thickness" is cut across according to the true direction of the "pillaring." But when we form the eastern side of the pillar we cut it on the whole more nearly perpendicular than the "pillaring," and by cutting across the "pillaring" we weaken the rock.

1422. Do you mean that as you get deeper into the ground, if a piece splits off from the side of the pillar, it is a larger piece than would split off higher up?—No, not that exactly.

1423. Will you explain it?—When we are under-ground at a great depth, and we drill a hole and it is blasted, it "scribes." It does not cut quite like the pillar.

1424. What do you mean by a "scribe"?—The pillaring is a natural line of rending, and so is the cleavage, but a scribe is a line of rending which is between the cleavage and the pillaring.

1425. (*Mr. Jones.*) Do you know what is the angle of the "scribe"?—No, I do not. They vary.

1426. It is the weakest way of cutting it?—Yes, we consider it an unnatural cut.

1427. (*Chairman.*) Do you think that accidents from falls increase in number as you go down?—Yes, I believe that.

1428. Do more accidents happen from falls of roofs and walls in the Oakeley Upper quarry than in the Lower quarry?—I am not aware. I have never observed that.

1429. (*Mr. Jones.*) Which of the two quarries is the deeper; the Upper or the Lower?—The Lower.

1430. You made a statement just now that as you go deeper the accidents increase, and you have just said that you do not know whether most accidents happen in the Upper or in the Lower quarry?—There have been a good many falls of roof in the Lower Oakeley, so that there is a good deal of it open now; but in the way you meant by your last question just now the Upper quarry is the deeper.

1431. You mean the more the length of the slate wall the more the danger from falls from pillar or roof?—Yes, that is so. The weight, of course, is more.

1432. What width are your pillars?—They vary from 14 to 20 yards.

1433. Do you happen to know what amount of pressure one of these pillars will bear?—No, I do not.

1434. Are they cut to such an extent that you use every possible stress, and that they can carry no more load than they do?—As far as we can, we cut it to the width we get at the commencement, and we are not allowed to make it narrower or wider unless there is something in the nature of the ground calling for it.

1435. So you do not know whether the pillar is strong enough to hold the roof or not?—No, I do not.

1436. Can you tell us upon what principle the roof now stands on these pillars?—Only like a tie.

1437. Is it like an arch or a beam-roof?—Like a beam-roof. When the slant which forms the roof gets to be insecure or loose, they sometimes arch it.

1438. That is, when the beam-roof is not sufficient to support the base, they depend upon the arch roof?—Yes, they do that, as a rule, when it can be done.

1439. (*Mr. Jenkins.*) Have you any proof that there is more pressure upon the pillars as you go lower down than there is at the top?—Only the effects that we see. We believe it to be so.

1440. And what are those effects?—The falls, and the "scribes" which occur as we get deeper down.

1441. Is the rock more liable to "scribes" in the lower part of the quarry than at any other part?—Yes, it is.

1442. Is it more so in the lower floors than in the upper parts of the Lower quarry?—Yes.

1443. Is that a proof of the pressure?—Yes, I would take it to be so, and experience generally teaches that.

1444. Are the men more liable to cut the pillars on the eastern side of the chamber perpendicularly than they do on the other side?—Yes, and they must do it as a rule.

1445. And by so doing they, in your opinion, weaken the pillar?—No, not so much, because they do not injure the slate rock as they do in cutting from the western side. Neither the pillaring nor the cleavage come down quite straight, but they lean a little bit, so there is a better chance of not spoiling the rock on the eastern side than on the western side.

1446. But does that not weaken the pillar?—No, it has a better chance not to injure it.

1447. By cutting that side perpendicularly would that keep the same breadth in the pillar?—Yes, and for this reason,—the rock is not vertical on that side. We have to cut away from the pillar.

1448. (*Chairman.*) To step it out?—Yes.

1449. (*Mr. Jenkins.*) You said also that the weather affects the pillars under-ground. Is there a difference in the weather at certain times under-ground?—Yes, there is, and that affects the quarry, after a long drought, and when this is followed by wet weather, there are frequent falls of rock. Any change in the weather of that kind causes falls. That is the general rule.

1450. What is the state of the atmosphere there in the summer months generally?—It is cool.

1451. And is it damp?—Yes.

1452. And smoky?—Yes.

1453. Is it so in the winter?—No.

1454. What is it then?—It has a tendency to become drier and clearer.

1455. Do all the chambers dry up in the winter, whilst in the summer they get wet?—Yes, that is so.

1456. Do you believe that would affect the pillars?—Yes.

1457. (*Mr. Evans.*) You say that the pillars are cut in their proper size, generally speaking?—Yes.

1458. Then you have no complaint that the pillars are worked narrower?—No, I have not, there has been no special cause for complaint now for years.

1459. So that any rumour to the contrary is not correct?—It is decidedly incorrect, as far as my experience and knowledge go.

1460. (*Mr. Jenkins.*) Do you think it would be of advantage to have a sub-inspector under Government, and that he should be a Welshman and a practical man?—Yes, I believe it would.

1461. You think he should be a man who can speak to the workmen in their own language?—Yes, I do, and that for many reasons. In the first place we consider that the quarries require more supervision as they get deeper, and we want an experienced man to see that they are properly looked after. We believe that the present inspector cannot, by reason of his district being so extensive, see that what ought to be done is done.

1462. (*Mr. Greaves.*) Do the agents not see to that matter at the present time?—Yes, they do, in a measure, but they might be more perfect, and it is very likely that they will become more perfect in time.

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1463. (*Mr. Jenkins.*) In making the suggestion as to a sub-inspector, you do not suggest that there is any deficiency in the present inspector in the carrying out of his duties?—No, certainly not. I do not mean to suggest that at all.

1464. He has done his work well in the past, and has met with general approval?—Yes, he has. There is one thing I should like to refer to. I wish to speak in a general way on the subject, but I shall be prepared to give particular instances from the quarry if they are required. If the agent at present does see that everything is done properly, and that the rules are strictly carried out, I do not think it is done elsewhere, and perhaps the present agent's successor may not do it. If, however, there was an inspector under the Government who was a thoroughly practical man he would see that all this was done.

1465. Therefore you think that practical knowledge is very essential?—Yes, certainly. There are several very difficult matters in connexion with the work of inspecting a quarry,—the difference in the joints, the effect of the weather on those joints, and such matters, which are quite a mystery to all except the experienced workman. He must be a practical man.

1466. (*Mr. Greaves.*) What do you mean by a "practical man"?—A man who has worked in a quarry, and who understands the rocks through experience.

1467. (*Mr. Jones.*) You mean a man who has gained his experience through working?—Yes, quite so.

1468. (*Mr. Jenkins.*) Would a man who has gained his experience through working as a slatemaker meet your views?—No, not as a slatemaker only.

1469. Therefore you require that he should have experience in under-ground working as well?—Yes.

1470. (*Mr. Greaves.*) What amount of engineering or scientific knowledge do you think an inspector ought to possess?—It would not be necessary for the sub-inspector to have much of that kind of knowledge if there was a scientific man above him.

1471. So that your view is that you should have two inspectors?—Yes, quite so. The qualities which are essential are so wide apart that it is impossible, in our opinion, to find them in the one man. What I mean is, that you cannot get a man who has the requisite scientific knowledge. and who is also a practical working quarryman as well.

1472. It has been suggested that the agents do inspect the work properly at the present time; are they all competent to do that?—I do not consider that any man is competent to make inspection unless he is a practical quarryman, and I believe that there ought to be in every quarry one agent, at least, who is an experienced man.

1473. You mean an under-ground workman?—Yes, there ought to be one such man on the staff at every quarry.

1474. Are they so at your quarry?—Yes, there is one at least in each part of the quarry, if there are not more. There are perhaps two or three.

1475, And are they so in the other quarries?—No, not in all of them. As far as I know there is only the Llechwedd and the Oakeley quarries where there is a rockman as agent. It is not only of advantage to the workmen, but to the master as well, that there should be a man of that kind on the staff.

1476. (*Chairman.*) Do you mean to say that it is only at Llechwedd and Oakeley that there is a man on the staff who is competent to make these inspections? Yes, I believe that that is so. It is in the Oakeley and Llechwedd quarries only that there are men who are able, in our opinion, to carry on these inspections as we should like them to be carried on. That is our opinion.

1477. (*Mr. Jenkins.*) Could you deceive an agent who has gained his experience as a slate-worker only on a question as to the dangerous part of the rock, if you wished to do so?—Yes, under some circumstances I could.

1478. So that he should have under-ground experience as well?—Yes.

1479. With regard to the periodical inspection, what do you mean by that? Do you mean that periodical inspection should be made every six months, as the last witness suggested, in every place throughout the quarry?—Yes, it should be made at least every six months, and in many circumstances it should be made oftener.

1480. Would not that incur considerable expense, and possibly much danger?—No, not so much. I have recently had experience of that in a special manner. There have been examinations with the Wells light which have been very useful. By means of that light we have been making an examination of the chambers recently, and I do not think it has been done before for about 18 months.

1481. (*Chairman.*) You are now referring to your particular chamber?—Yes. It has proved how beneficial it is to make an examination of that kind, because many dangerous things have been removed after an examination has been made in that way. This shows that time and the weather affect the rock in such a manner that it becomes often very dangerous.

1482. (*Mr. Jenkins.*) Do you mean that a periodical inspection should be made with the Wells light?—No, not exactly that, I have only just referred to that. I consider that a great deal of good has been done with the Wells light, but I do not think it is quite sufficient. They have put up a ladder which is 34 yards long. They find things get loose under the clay-slant and which subject the men to dangers. I would suggest that the quarry owners offer a prize for the best kind of ladder which could be erected to get at these dangers.

1483. For the purpose of inspection?—Yes. That would be much less expensive than the present mode, and the work would be done more effectually.

1484. Would you inspect by that means every place in the quarry every six months?—Yes, everywhere where there is working. I will refer to one instance to show the necessity for that in the place where the 34 yards ladder I have referred to was raised, the place had probably been left for 10 or 12 years without an inspection. The Wells light was not powerful enough to show the roof at such a great distance, and a portion fell from the roof less than two months ago, and they then erected this ladder to examine it.

1485. Can you tell us what would be the length of the longest ladder that would be required?—From 50 to 60 yards.

1486. Perpendicularly?—Yes, taking the greatest thickness of the vein.

1487. (*Mr. Jones.*) 180 feet?—Yes.

1488. (*Chairman.*) But the longest ladder which would be used is 34 yards?—Yes.

1489. (*Mr. Jenkins.*) You would go to places that have gone out of reach?—Yes.

1490. Do you mean to inspect those places before they go out of reach by some responsible inspector under the quarry owners?—Yes, that is what I mean.

1491. (*Chairman.*) Are you aware that there is a special rule to that effect at the present time?—Yes, but that is very indefinite.

1492. Rule 48 states that he shall see that the roof of each new chamber is left in a safe condition by the miners before any slate is allowed to be worked underneath; is that rule carried out?—Yes, that is done, but I am not referring to that rule, I am referring to rule 46. The rule you have quoted only refers to the roof, and you must take the pillars into account as well.

1493. (*Mr. Jenkins.*) Would you impose the responsibility upon the management of inspecting every "thickness" before it is allowed to go out of reach?—Yes, it would be a great advantage.

1494. Why would it be an advantage?—Every man is not as careful as he should be, and it would be safer if an inspection of that kind were always made. I believe that men have lost their lives in these quarries owing to the negligence of men who had been working at the place perhaps 10 or 12 years previously in not removing what was dangerous at that time.

1495. Would you give that man any other work to do besides inspecting the pillars and so on?—I should not like to define his work exactly, but he ought to be a practical man. In a large quarry it might take him all his time to attend to that work properly, but in a small quarry he might do other work as well. The employers would have to define his duties. He ought to be a responsible man—one that you could fall back upon when necessary.

1496. Would you make him responsible for inspecting the ropes and so on?—Yes, I would.

1497. (*Mr. Greaves.*) But you said just now that you would not require him to have engineering knowledge?—I am referring now to a man to be appointed by the quarry management, and not to the sub-inspector under Government.

1498. (*Mr. Jenkins.*) You would put the responsibility entirely upon the owner to look after every place, and to make it safe, and to see that the appliances are kept in good condition?—Yes. I would put the responsibility upon them, but at the same time I would not take any responsibility away from the men.

1499. Do you think that would tend to make the workmen themselves more careful?—Yes, I believe it would. Every inspection of the rock by a practical man would enable the agent to find out where any fault lay, and to enforce discipline, and it would accordingly make the men themselves more careful.

1500. (*Mr. Greaves.*) Are the present agents not able to do this work now?—As far as I can say, they do so.

1500*a*. (*Mr. Jenkins.*) Is there in each quarry one or more practical men able to do the work?—I know there are one or more men of that kind in each portion of our quarry.

1501. But are they in every quarry?—I cannot say that there are except at the Oakeley quarries and Llechwedd.

1502. (*Mr. Jones.*) You say that the Oakeley and the Llechwedd quarries have a number of men such as you have described looking after the working of the quarries at the present time?—Yes, according to the evidence of the representatives.

1503. Do you mean to ask for the appointment of a Government inspector or sub-inspector for the other small quarries?—I mean that the large and small quarries should be under the same inspection exactly.

1504. Then supposing, instead of having a Government inspector, that the small quarry owners were to appoint proper men for the purpose, would that make up for the Government inspector; is that what you mean?—That is not what I say. I want a sub-inspector to be appointed to assist the present inspector.

1505. You say you are already satisfied with the present arrangements as far as regards the Oakeley and Llechwedd quarries?—Yes, as far as I know they are satisfactory. There is a rockman who is an agent, and he assists the other agents to do the work thoroughly.

1506. Then you would be satisfied if an agent of that kind were appionted in the small quarries, the same as in the Llechwedd and Oakeley quarries?—I believe it would be an advantage to the men who are employed at the smaller quarries.

1507. But would you be satisfied if the same thing were carried out in the small quarries as in the large quarries—the Llechwedd and Oakeley?—There is an implication in the question which is not warranted by anything I have said. I said that there were men who were able to do the work, but I did not say that the work might not be done more carefully.

1508. (*Mr. Jenkins.*) You mean to inspect the sides of the pillars?—Yes.

1509. And is that done at the present time?—No, not so carefully as it ought to be done.

1510. Can the agents do that work and perform their other duties as well?—I cannot say anything as to that. They are responsible for that.

1511. (*Mr. Greaves.*) How often would it be necessary for the agent to visit a bargain?—Say, on an average, every six months.

1512. And how long would it take an agent to inspect such a bed in one bargain?—Two hours would be quite enough in each bargain.

1513. So that he could inspect five or six bargains a day?—That depends upon circumstances, but I should not like to tie him to that.

1514. But at that rate it would not take an agent long to inspect all the bargains in one quarry?—No, unless it is a very large quarry.

1515. (*Mr. Jones.*) What do you mean by saying that the work could be done in two hours. Do you think that the inspector would only inspect the "thickness"—the last "thickness" that the men had worked home, or would he inspect every "thickness" from the roof downwards?—What I want is that each "thickness" be examined when it has been worked home, because the inspection that is made with the light and ladders meets what you are referring to.

1516. (*Chairman.*) Do you know of accidents which have happened through rock falling owing to men having left the pillars unsafe?—I think I have one instance before my mind now, and I do not think that the one who was at the quarry at the time knew who had left it.

1517. It had been left long ago?—Yes.

1518. And did an accident occur in consequence of that?—Yes. The accident resulted in the death of one man, and serious injury to another.

1519. Was it a fall of the side of the pillar or the roof?—It was from the pillar, close to the clay-slant. It was at the Middle quarry.

1520. (*Mr. Greaves.*) And when was that?—It was about 18 years ago. Of course that is only one instance.

1521. (*Chairman.*) Have you taken part in the fixing of ladders to inspect a roof?—Yes, I have been doing that work.

1522. Does it take long to put up a ladder?—It depends upon the height required.

1523. Say a ladder 50 feet long,—how long would it take to fix that?—It would not take very long.

1524. How long would it take?—It depends on the appliances you have on hand at the time.

1525. If you had one 25 yards long, how long would it take to put that up?—It would take a good half day.

1526. Only half a day?—Yes, with the imperfect appliances such as we have.

1527. (*Mr. Greaves.*) Only half a day?—Yes, to raise the ladders up, but there is work to be done after that.

1528. (*Chairman.*) Could you put the ladder up in that time?—Yes.

1529. (*Mr. Jones.*) Do you know what time it took to put up the 34 yards ladder lately in your quarry?—I think it took from three to four days. The time required varies a good deal, according as the length increases.

1530. (*Mr. Evans.*) Can you tell us to what you attribute the increase in the number of accidents as they are referred to in the statement which was made by the previous witness. The number is said to have increased during the last 10 years from 32 to 48 per cent.—how do you explain that?—I believe it is through falls of rock. I think that is the explanation given, and it also agrees with my experience.

1531. Were they falls from pillars, or from the working places?—I cannot say. The only thing I can say is, that the falls are more numerous, as far as my experience goes, from the pillars than from the roof.

1532. You admit it is very important to know that, because one is under the care of the owners and the other is under the care of the workman?—The only examination the workman can make is within a distance of 3 or 4 yards. The falls are generally from places which are not within the reach of the men.

1533. Then you cannot say whether this increase in the number of accidents of that description has been due to falls from places which were out of the reach of the workmen?—No, I cannot. I can only say that the statistics show that they are due to falls of rock.

1534. But "falls of rock" is a very wide term, and includes cases where a man is standing under a rock?—I did not know that.

1535. (*Mr. Jones.*) You remember Mr. William C. Williams giving evidence?—Yes, I do.

1536. He stated in his evidence that the majority of these falls were from the breast,—you do not agree with him?—No, I do not. At any rate, I have nothing in my experience pointing to that.

1537. (*Chairman.*) Are you aware that out of four fatal accidents that have happened this year from falls of ground, only one has happened from an unexpected fall of slate from the side of a chamber?—I only know of three accidents of that kind this year,—one from a fall from the fore-breast, another in the Upper Oakeley from a fall from the pillar, and another from the fore-breast.

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1538. No, there have been four this year, and out of the four, only one has been owing to an unexpected fall from the side of a chamber or pillar?—Yes, that is so.

1539. (*Mr. Jenkins.*) As regards the accident in the Lower Oakeley quarry, was there anything in the circumstances to explain its occurrence, besides the fact that it came from the face of the rock?—I believe it occurred owing to want of care on the part of the workman, as far as I know.

1540. Was the chamber open through at the top?—No, it was not.

1541. Are these kind of chambers rather dangerous to work in in that way?—Yes, they are, but that accident need not have occurred of necessity. It was low enough down, and it was not that hole that the men had blasted at the time.

1542. But in the present case it was impossible to work it otherwise?—Yes, it was. I would like to suggest one improvement while you are on that point. When there are chambers like that with no opening at the top, when the men have driven from 10 to 15 yards, it is very inconvenient after blasting. There ought to be a place for the men to go to.

1543. (*Mr. Evans.*) Do you mean after firing or after the blast?—After the blast, because the men have to go up to face any danger there may be.

1544. Are non-fatal accidents numerous, as far as you are aware?—Yes, they do take place, and a good many of them sometimes.

1545. I suppose they occur from the same causes as the fatal accidents?—Yes, they do, generally speaking.

1546. (*Mr. Jones.*) What would you suggest would be the remedy for doing away with the necessity of the men going up to face the loose rock after blasting, which you referred to just now?—The roof ought to be higher up by three or four yards, or it ought to be widened a little higher up, so that two men may have a safe place to go to.

1547. Is it not your practice to let three or four yards of the roof remain without being widened, so that it may be a shelter for the men?—No.

1548. What would be your remedy?—There is nothing except to roof higher up and turn a little bit of one side. It might be pretty safe.

1549. Suppose you leave the clay-slant unworked, would it not be a sufficient place for them to go down and turn there for safety?—No.

1550. And for them to go out from under the roof and turn in?—Yes, it would.

1551. Is that not your general practice always?—We never make any provision, as far as I know. To the miner it is a question of being ordered to do it, and paid for doing it, but to the rockman it is a question of safety.

1552. (*Mr. Evans.*) Have you anything more to say to us about inquests?—Yes, I believe it would be a very great advantage to have men on the jury of the same occupation as the deceased. It would help to arrive at the truth with regard to the cause of the accident. The questions sometimes asked of the witnesses are rather irrelevant, and a man who does not understand the work may ask questions in a way which is not intelligible. It is very often difficult to get at the truth in such matters, and the presence on the jury of a few practical quarrymen would be of very great assistance.

1553. (*Chairman.*) Would you suggest that the coroner should give instructions to the police to summon a certain number of practical quarrymen to be on the jury at inquests upon quarrymen?—Yes, I would, most certainly.

1554. (*Mr. Jenkins.*) Would you suggest anything else as to inquests?—There is nothing else, as far as I can remember now.

1555. Do you know that there is considerable reluctance on the part of men to give evidence?—Yes, under some circumstances there is.

1556. (*Mr. Greaves.*) Is that at inquests?—Yes.

1557. (*Mr. Jenkins.*) And legal proceedings generally?—Yes, that is so.

1558. (*Mr. Evans.*) Do you know of any instances where men were unwilling to go and give evidence before the magistrates?—Yes, I know of cases where they felt a reluctance in coming forward.

1559. (*Mr. Greaves.*) Can you give us an instance?—I should not like to bring forward the names of persons.

1560. On what occasions was there a reluctance?—In cases of accidents. It is quite a common thing to hear men say, "I don't wish to go and give evidence." They are weak men, and they are afraid that it will affect their circumstances.

1561. Can you give us instances?—I prefer not to gives names.

1562. (*Mr. Jones.*) Can you give us an instance without giving the names of the men?—Yes, one was in the case of the Welsh Slate Quarry.

1563. (*Mr. Greaves.*) And when did that occur?—About eight years ago, or perhaps it is more.

1564. And what were the circumstances?—The family of the deceased were asking for damages. There had been a fatal accident, and there were witnesses who were to be called, and they came forward to give evidence, and they say that they had to suffer for so doing to the end of that management.

1565. They say so?—Yes. Of course I am not responsible for the statement. I am simply relating what those people say.

1566. (*Mr. Jenkins.*) Is it a fact that it is generally said in the neighbourhood that it is not safe for the men to come forward to give evidence?—That is the impression in some cases. There are some who are afraid. I cannot say what is the reason for that, unless it is that some of their relatives or friends have suffered in the past, we know not for what.

1567. (*Mr. Greaves.*) What cases do you refer to?—Any cases which call for the attendance of the men as witnesses. It is a difficult matter to get them to attend to give evidence even before this Committee, and for the very same reason.

1568. (*Mr. Evans.*) Do you think there is any real ground for fear?—The best proof I have is that the men are afraid to come forward and give evidence, and the reason they give is that they are afraid they will have to suffer, the same as their leaders have had to do.

1569. (*Mr. Greaves.*) We have had several witnesses here who have stated that there is no ground for that belief, and that they do not know of any instance of that kind. Were they stating what was not the fact?—The statement I have made was made at the committee meeting of the workmen. It was said that no men would come from some of the quarries, and some of the men who have been appointed to give evidence on behalf of the men refuse to come for the same reason. I should like to add that that statement does not apply to the Oakeley quarries.

1570. (*Chairman.*) You say that in the case of the action against the Welsh Slate Company the men were afraid to come forward to give evidence in an action for compensation. Were legal proceedings taken against the Welsh Slate Company in order to recover damages in respect of an accident?—Yes, there was an action, and that is what I refer to. Of course the Company has ceased to exist since then.

1571. But you say there was an action?—Yes, there was an action brought against the old Welsh Slate Quarry Company.

1572. (*Mr. Jenkins.*) Was it an action to recover damages, or proceedings taken by Dr. Foster against the Company?—I think it was Dr. Foster that took the proceedings.

1573. (*Mr. Jones.*) Then do you wish to correct your former answer; you stated just now it was an action to recover compensation?—Yes, I do. The family meant to come in after Dr. Foster, and the witnesses who came forward say they had to suffer afterwards for the evidence they gave on that occasion.

1574. (*Mr. Jenkins.*) It is suggested that walls should be erected in the middle of the disused levels instead of fencing?—Yes.

1575. What do you mean by that?—When the level has been worked out I would recommend that a wall should be built right across in the middle of the level. In some cases there may be a chamber on both sides, and there may be danger from blasting. About two months ago there were two powder chests in a level, and the two chests were broken by a blast, and if there had been any men near there would have been a fatal accident. I want a wall to prevent anything passing.

1576. What is the difference between a wall and a fence?—A fence will never keep men from going

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through, but a stone wall would, and nothing else could pass through.

1577. You are speaking of a fence as it is made now?—Yes.

1578. (*Chairman.*) You say that stones pass through the present fences?—Yes.

1579. And men have before now taken advantage of the fencing to go over it to relieve their bowels?—Yes, and they very easily fall over and have done so.

1580. Would it not be advisable to leave a passage for the agent to go through to make any inspection that may be required?—No, I think not. It would be seldom required. The wall could easily be pulled down if that were needed. If the wall were in the middle it might be a protection for the men after firing.

1581. (*Mr. Evans.*) You say care should be taken to ensure accurate evidence being given at inquests?—Yes.

1582. What do you mean by that?—I cannot point to any instance; but the general complaint is that sufficient care is not always taken to bring forward the most important witnesses at the inquests. No one is ready to come forward with instances of that kind of thing, but it was mentioned at our meeting as being an important matter, and one that should be laid before this Committee.

1583. (*Mr. Jenkins.*) If there is any fault there, it lies with the policemen, does it not?—I cannot say whose fault it is.

1584. (*Mr. Evans.*) But as a body of workmen your opinion is that there should be more care taken in that respect?—Yes, that is so.

1585. Do you think that the workmen as a body should have the right to appear at inquests?—Yes, I believe it would be of advantage.

1586. (*Mr. Jenkins.*) And that they should be represented by counsel or solicitor if they wish?—Yes, if there is any necessity for it, so that there should be no room for suspicion. Our opinion is that everything should be conducted as openly as possible.

1587. A suggestion has been made with regard to cranes; what is your view about that?—It is a difficult matter to decide. It would be well to have a brake, or something of the kind, to act on the crane, so as to prevent accidents. I do not know whether engineering skill has done its best in that direction or not. At Bryneglwys, Abergynolwyn, they have a winch.

1588. (*Chairman.*) Would you suggest a brake on the cranes as used at those quarries?—Yes; but it should be a more practicable one than the one that was tried.

1589. Did they try a brake before?—Yes; I did not see it, but I have been told about it. It was not practicable.

1590. Are you sure that a brake was supplied?—So I was informed, but I cannot speak from my own knowledge.

1591. (*Mr. Jenkins.*) You heard the evidence of Mr. W. C. Williams?—Yes.

1592. Do you agree with what he said as to the special rules?—I agree with him in some respects. There ought to be an improvement in them. The rule as to the wooden rammer, for instance, is quite impracticable. With the powder, when we charge a hole, we have a wad of straw or something of that kind, and then we have the powdered slate on that, so that there is no danger from explosion in that way; in fact, I have never heard of any accident in connexion with that. With regard to keeping unused powder in the bugles, I think the object would be gained if the men were ordered to place the bugle in a place beyond the reach of the blast. It would be quite as safe there as it would if they took it to the chest, and it would be much more convenient for the men.

1593. Do you agree with Mr. W. C. Williams as to the rest of his evidence?—No, not exactly. I believe you may make additions to the rules. Rule 46 is too indefinite, but the suggestions which were laid before you by the previous witnesses would meet that.

1594. (*Chairman.*) You mean with regard to the periodical inspections?—Yes, and also as to the different thicknesses.

1595. (*Mr. Jones.*) Does it strike you, as a practical man, that the 46th Rule was ever meant for a slate quarry?—I do not know indeed. It does not look like it at any rate. The word "frequent" or "often" is much too vague. If a man goes to America three times in five years he goes there often, and if he goes to a public-house three times a day he goes often. The word is much too indefinite.

1596. (*Chairman.*) Have you anything else to say?—I do not quite agree with one statement that has been made before you. It was said that a rockman became an experienced man in two or three years, but I do not believe that any agent who understands his work (and I know that many of them do) would approve of that statement. It requires a man to be working for four or five years at any rate before he can be considered a good practical rockman. A man ought to be taken as young as possible to work on the rock, and if possible he should have some experience as slate-maker before going to work under-ground.

1597. (*Mr. Jones.*) What do you mean by saying that they should commence "as young as possible,"—what do you say with regard to boys?—I consider that boys ought not to go to the quarry at all under 16 years of age. They should then work at slate-making for three years, say until they they are 18 or 20 years of age, and then they may be sent to work under-ground as rockmen. In that way they may become experienced and practical workmen.

1598. (*Mr. Evans.*) Do you believe that the quarry proprietors suffer from men who are not competent?—Yes, I do, and I can give instances of that, if necessary.

1599. To a great extent?—Yes.

1600. And I suppose you consider that their partners suffer to some extent as well?—Yes, they do, under some circumstances.

1601. Is it your opinion that, in consequence of their inability to look after everything in connexion with their work, these men bring accidents upon themselves and their fellow workmen?—Yes, they are very liable to do that.

Mr. William Morris examined.

Mr. W. Morris.

1602. (*Chairman.*) Where do you live?—At Talsarnau.

1603. What is your occupation?—Rockman.

1604. And how long have you worked as a rockman?—For about 29 years.

1605. Did you work above ground at the quarries before that?—I was not working as a slatemaker.

1606. How many years have you worked altogether in the slate quarries?—For about 32 years.

1607. Where are you working now?—At the Oakeley quarries.

1608. Have you any suggestions you can make to us for the prevention of accidents?—No, I have nothing new to suggest, but I can confirm what has been said by my fellow workmen.

1609. Do you think the rock is getting less safe as you get deeper?—Yes.

1610. And what is the reason of that, do you think? There is more weight thrown upon the pillars. That is the only way I can explain it.

1611. But is not the rock itself more solid as you go down?—Yes, as a rule, it is more solid.

1612. May not that improvement in the solidity be sufficient to counteract the extra weight?—It is the "scribing," as a rule, that makes it unsafe.

1613. (*Mr. Evans.*) Do you consider that the rock at a great depth is more subject to "scribes" than it is at a higher point?—Yes, I believe so.

1614. And to what do you attribute that?—To the pressure.

1615. Is there anything in the nature of the rock that you think may be the cause of it?—I do not know; but we do not complain of "scribes" when the chambers are near daylight.

1616. Do you think that the solid slate rock is more subject to "scribes" than a softer one?—It is sharper as a rule.

1617. Do not you think that that will make it more subject to "scribe"?—There must be something that causes it to "scribe" as it does, and I believe myself that it is the pressure.

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1618. And nothing else?—I cannot say.

1619. (*Mr. Jones.*) You do not mean to suggest that a soft rock will stand more pressure than a solid one?—It is more pliable.

1620. Then do you think that a more pliable material will stand more pressure than a solid one?—I think it is better against "scribing" and becoming dangerous.

1621. (*Mr. Jenkins.*) Is it to that fact that you put down the greater "scribing" at the bottom of the quarry compared with that at the top?—I believe that is the reason.

1622. Tell us the reason?—As it goes deeper there is an increase of pressure. If you remove the pressure from one place it is bound to go to another. They never complain of "scribing" when they begin opening new chamber.

1623. Did you hear Richard Griffiths give evidence here to-day?—Yes, I heard part of it.

1624. Do you agree with the evidence he gave?—Yes.

1625. The whole of it?—Yes, as far as I remember.

1626. I believe reference was made in the suggestions to the water on the face of the rock?—Yes.

1627. Would you recommend that something should be done to that?—Yes, I would.

1628. By what means would you do away with that water?—By making dams to prevent the water flowing over the rock.

1629. Where would you make the dam?—In a convenient place to divert the water, so that it would not flow over the rocks.

1630. Would not that be a very expensive method of dealing with it?—No, I think not.

1631. Do you think it would pay?—Yes, I am sure it would.

1632. Why do you think that?—The men could do more work on the bargains if the place was made dry around them.

1633. (*Mr. Jones.*) Do you suggest draining the water or making a pool, or how?—I mean that the course of the water should be changed.

1634. To drain it?—Yes.

1635. (*Mr. Jenkins.*) You would put a dam across the chamber above?—If that will answer the purpose it can be done. I have seen that done, and I have also seen the water turned back in a contrary direction.

1636. (*Mr. Evans.*) Does this water come in a great quantity?—I do not hear any complaints as to that at the quarry at the present time.

1637. When it gets down to the tunnels does it accumulate and make the place wet for the men to walk through?—No, they cut ditches in them along the side of the level.

1638. If there are tunnels anywhere where the men have to walk through them, and the water wets their feet, you think that is a thing that should be condemned?—Yes, I do.

1639. (*Mr. Jenkins.*) Are there any privies where you work?—Yes, there are some; but not many in the part of the quarry that I am acquainted with.

1640. Do you work under-ground?—I work in the "fall."

1641. Where do you get your supply of drinking water from?—It trickles along the rocks from a well.

1642. Is there any danger of that becoming polluted?—There is a complaint about it.

1643. What sort of an eating-house have you?—It is a very good one.

1644. Would you recommend that the same kind of eating-house be provided generally?—Yes, I would. It would be a great comfort to the men.

FOURTH DAY.

At the Cocoa Rooms, Blaenau Festiniog, 21st December 1893.

PRESENT:

DR. C. LE NEVE FOSTER IN THE CHAIR.

MR. J. E. GREAVES, J.P.	MR. J. J. EVANS. F.G.S.
MR. E. PARRY JONES, J.P.	MR. JOHN JENKINS.

Dr. R. D. Evans.

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Dr. R. D. EVANS, Blaenau Festiniog, examined.

1645. (*Chairman.*) You are a physician and surgeon practising in Blaenau Festiniog?—Yes, I am.

1646. What are your qualifications?—M.R.C.P. and L.R.C.S. Ed. and L.S.A. London.

1647. How long have you been practising here?—I have been here for 18 years, and for the last 16 years as a fully qualified practitioner.

1648. Have you had much experience with the men employed in the quarries?—Yes, I have. My practice has been almost entirely confined to the quarrymen and their families. The most common ailments that I have treated are those of the respiratory organs, the digestive system, rheumatism in its various forms, such as lumbago, sciatica, and rheumatic fever. I have examined this week the counterfoils of my death certificates for the last 10 years, and I find that in that period there were 157 males who died above the age of 16 years, the average age at death being 50·75. Of that 157, the deaths from diseases of the respiratory organs numbered 78, being nearly half the total number of deaths. The number of deaths from consumption (*phthisis*) was 38, the average age of those dying from that disease being 40·5. The deaths from consumption represent a percentage of 24·1 of the total deaths amongst males. The number of deaths from pneumonia was 20, which is equal to 12·8 per cent. of the total. There were also 20 deaths from other affections of the lungs. During the same period the deaths amongst females numbered 129, the average age being 47·8. Diseases of the respiratory organs accounted for 31 of these deaths. Phthisis was the cause of 15 deaths or 12 per cent. of the total, and the deaths from pneumonia were 6, equal to 3·5 per cent. of the total. The great disproportion between the deaths of males and females from respiratory diseases, I attribute to the employment of the men, which necessitates their working in dusty and smoky atmospheres and being often exposed to draught when heated. Their diet and home surroundings are similar to those of the females.

The most common accidents I have met with are simple fractures and injuries to the head. The fractures in most cases are produced by rock slipping, and the head injuries from small pieces of rock falling from the roofs of the chambers or from the sides of pillars, and also from being struck with the handles of the cranes. Blasting accidents are also of frequent occurrence. The injuries amongst the slate-makers are mostly injuries to the hands.

With regard to the sanitary conditions at the quarries, I am informed that there are scarcely any privies provided in any of them, with the single exception of Llechwedd Quarry. In one quarry, in which 1,600 men are employed, there are nine privies, and the majority

of these are in a filthy condition and scarcely ever used. The excreta from such a large number of men must be enormous and a nuisance, apart from the possibility of the excreta contaminating the water that the men may drink underground, and thus cause typhoid fever, of which I have had experience. In addition to this there is the danger of exposing a portion of their body when heated in all weathers, which in my opinion is often the cause of the cases of congestion of the kidneys, and the large number of cases of lumbago and sciatica met with here in the winter and during the prevailing cold easterly winds of the spring.

The water-supply in all of the quarries is also not what would be desirable, being mostly stored in tanks, and not conveyed through pipes properly jointed; in several instances it runs from its source along open ditches, in which it is very liable to become contaminated.

In my opinion the barracks ought to be looked after more stringently by our Local Sanitary Authority. They are overcrowded and badly ventilated, and scarcely ever thoroughly cleaned. During the last month I had a case of infectious disease in one of these barracks, which was small and had too many occupants. Such cases, when they occur, are a source of danger to the neighbourhood, as the patients are often taken to their homes much sooner than they ought to be, and before they are free from infection. This is a source of danger to fellow passengers in the trains and public conveyances in which the patients travel. This urgently calls for the establishment of an infectious diseases hospital for the district.

The men are, generally speaking, strong, and free from a tuberculous or scrofulous taint, and as Dr. Roberts, the Factory Medical Inspector, stated yesterday, only strong and healthy boys are certified by him for admission to the quarries. They live a healthy and abstemious life, with the exception of constant inhalation of dust whilst at their work, which I consider injurious.

I am strongly of opinion that travelling long distances daily to and from the quarry is most injurious to the health of the men who follow that practice. I find that 177 men come to the quarries daily by the Festiniog Railway from Penrhyndeudraeth, 25 daily from Minffordd, 20 daily from Portmadoc, and about the same number from Tanybwlch. These men travel 16 in a carriage, and the dimensions of one of these carriages, as taken roughly by me the other day, are as follows:—Length, 3 yards 19 inches; width, 1 yard 23 inches; and height, 1 yard 21 inches, giving a space to each man of only 15·44 cubic feet. The carriages are ventilated by three square openings on each side, which open behind the nape of the neck of the passengers, and this must be extremely liable to give them chills and wry necks. Out of a total number of 601 who had sick pay from the Oakeley Quarry fund last year, 251 were men who travel by train; that is to say, nearly one half of the total number of those who received sick pay. The number of Oakeley workmen who travel daily by train is 450, as against about 1,100 who live in the district. The percentage of those who were on the sick list last year among those who travel daily by train is therefore very high, as compared with those who live in the district, being 251 out of 450 in the case of the former, and 349 out of 1,100 in the case of the latter. Many of the men who travel by train do a day's work before they get to their work at the quarry, and so have already fatigued themselves before their day's work is commenced. They return home late and rise early, and this must greatly curtail their sleeping hours. Men who, on a wet day such as this, walk from Tremadoc to Portmadoc, and then travel by the Festiniog Railway, cramped up in these so-called carriages, which are really no better than trucks, and who have afterwards to walk from the station to the top of the Oakeley, or the Cwmorthin, or the Votty and Bowydd Quarry, have really exhausted their muscular energy before they get to their day's work. Men who go through this fatigue every morning cannot possibly give a fair day's work for a fair day's wage. They also injure their health, for they take their breakfast early and are in a state of semi-starvation until they partake of their so-called dinner at mid-day, which principally consists of bread and butter and tea. Their night's rest, also, must be very inadequate under such conditions as these. It cannot be within hours of what a working man ought to have, which is supposed to be about eight hours. I was going this day week by the 3.40 train to Tanybwlch, and I saw some quarrymen waiting about at the station. They were dripping wet, and I spoke to them. They told me that if they had wished they could have gone home by the 1 o'clock train by paying 4*d.* extra, but they did not care to do that, as they thought the weather might clear up. The consequence was that the men—eight in number—had to remain at the station in their wet clothes for some hours, without even a fire being provided for them, in fact, they were treated more like animals than human beings.

1649. (*Mr. Greaves.*) That was the Festiniog Railway?—Yes, at Duffws Station. They were at the station before 3.30 to my knowledge. They asked the porter for a fire, and he said there was none for them. They had probably been waiting since 2 o'clock, if not before that. It is frequently the case that the men have to lounge about for hours in their wet clothes. In the summer months, again, the workmen's train is left until the last, and instead of leaving at 6 perhaps they leave at 6.45. If the men keep up the habit of going home every evening, the railway arrangements ought to be taken into consideration. For my own part, I would like to impress upon the men the importance of living near their daily work, and if there be scarcity of houses the employers ought to build proper houses in the neighbourhood of the quarries for the men, and let them at a fair rent.

With regard to ambulance work, a knowledge of how to check hemorrhage is of importance to the men. Tourniquets ought to be supplied on all the floors, and men taught how to employ them. The last accident I had, about a month ago, was a case in which death was almost directly due to bleeding. It was a case of compound fracture, and the man had really almost bled to death. The men of course had done their best with the knowledge they had, but they would have been able to do much better if they had been properly instructed in ambulance work.

The men and their families are comfortably housed in houses that they mostly own themselves, and which are model working-men's houses. The few houses that I consider deficient in accommodation in most cases belong to the employers. I produce photographs of some of these houses, but not of the worst of them, as, owing to the inclemency of the weather, they could not be taken. These are houses which I think ought to have been condemned by our local authority years ago, being generally damp, and too small for the inmates; and lacking sadly in ventilation.

The men are of highly moral and temperate habits, and diseases and deaths brought on by intemperate habits are exceedingly rare among them. More care in the matter of changing under-clothing and damp clothes would be desirable, and more frequent ablutions would also be of assistance in maintaining the health of the men. A better knowledge of general hygiene, also, would be of considerable advantage. At present we have no facilities for the men in the way of baths. I consider we ought to be provided with public baths, if we are to progress with the advance of sanitation and hygiene in these days. There is no doubt that a public bath in such a populous district as this would be a great acquisition, and ought to be considered by the Local Board.

With regard to the question of diet, I do not believe that the people here live quite so sparingly as is generally supposed. I do not think there is a town in North Wales of its population in which the inhabitants eat so much meat and drink so much milk. On an average from 1,800 to 1,900 gallons of milk are sold here every week, and not far from 15 tons of meat.

It is essential that there should be a proper and pure supply of water to various places in the quarries, where the men in the hot summer months may quench their thirst without running the great risk of taking contaminated water. Owing to the large rainfall here—from 80 to 100 inches annually—the fæces on the surface are washed away, otherwise the accumulation of them during the years would have been immense; but the polluted rain-water percolates through crevices, and a quantity of it runs to the under-ground workings, and there probably is often drunk. In the summer time I have noticed that we have a great number of men who are attacked with diarrhœa and vomiting (English cholera), which we cannot attribute to the eating of unripe or bad fruit, inasmuch as the men do not eat anything of that kind. They cannot get anything of the kind in the quarries, and they do not buy it at the shops in the village. I attribute it to the men drinking water which was unfit for them. I was here yesterday when one witness stated that the men took water to drink which they had been warned by an official not to take. In that very

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quarry the officials themselves, I am told, get their water a distance of one mile away, from a spring at Talyweunydd, whereas the men drink water that they have been warned not to drink.

1650. (*Chairman.*) According to your figures, one half of the males died from diseases of the respiratory organs, and only about one quarter of the females?—Quite so.

1651. And you attribute that difference to the occupation of the men?—I cannot attribute it to anything else. The mortality tables of males and females throughout England and Wales, as compiled by the Registrar-General, show that more females die from diseases of the respiratory organs than males. The report of the London Hospital, on the other hand, shows that the males have a larger per-centage of deaths from those diseases, but the per-centage is not so large as I have found it to be at Festiniog.

1652. Have you prepared any tables showing the proportion between the men employed above-ground as compared with those who work under-ground?—No, I have not. I could not do that very well from the nature of our death certificates. We are not asked to give the occupation, simply the name and residence and when last seen; but from memory I have no hesitation in saying that the majority of the deaths from consumption have been among men working in the sheds, and the majority of the pneumonia cases have been among the men who work under-ground.

1653. What would you suggest in order to make the sheds healthier?—To diminish the dust. In what way I cannot say. There is no doubt the men work in dust all day long. They are as it were in an atmosphere of dust, and deaths from respiratory diseases are always high when men inhale dust. There is a great difference between slate dust and, say, coal dust. If you look at the dust of stone and the dust of slate under the microscope you will find sharp angular points in both, whereas in the dust of coal you will find rounded corners, which makes the dust very much less irritating to the respiratory passages.

1654. Leaving apart the nature of the dust itself, are there more particles in a slate mill or in a flour mill?—Apparently there are most in the flour mill. The slate dust is not quite as visible, except in the summer time. I have been in these slate mills in the summer time, and the whole place has been a cloud of dust.

1655. Do you think there is more dust in the summer than in the winter?—It is seen more. The dampness of the atmosphere in winter may be the means of keeping it down as it were, so that it does not float so much in the air than as it does in the dry summer months.

1656. I understood you to say that a case of typhoid fever had been caused by drinking impure water in one of the quarries?—Yes; there was one case which I investigated with Dr. Rees, the Medical Officer of Health. It was notified to him before the Act was adopted, some years ago. I arranged to meet him at Trawsfynydd, and we investigated the case together. We went to the man's house, and found that in order. There was no other case about, so that there could not be a common cause for the disease, and after endeavouring to trace the cause of the disease in every possible way, we had it from the man himself that he was in the habit of drinking water from a certain part of the quarry underground. Last year I had another case, which was also investigated by Dr. Rees and myself, and we could not trace it to any other cause than the man being in the habit of drinking water dripping down the rock; men underground have no other means of obtaining water in any of the quarries.

1657. Were there any other men drinking the same water who did not get the typhoid fever?—They would probably not drink from the same spot. You have it dripping here and there.

1658. You were telling us about the men from the Oakeley Quarry who travel by rail, and you said that something like half the number had been on the sick fund last year. Were they suffering from diseases which might have been caused by draughty railway carriages?—I cannot say anything as to that, because I did not attend them; I have only got the figures as I have just given them to you.

1659. Is there a dearth of house accommodation at Festiniog, and are the men obliged to live away?—At present there is a great scarcity of houses, especially during the last six months or so. At all events, that is my experience, and the rents are high.

1660. You referred to an accident which took place a short time ago, in which the man bled a good deal?—Yes.

1661. At the inquest it was stated that the bleeding was stopped within eight minutes from the time of the accident,—do you think that likely?—When I saw the man he was simply in a state of collapse from loss of blood.

1662. Do you think he would have been brought into that state by bleeding for eight minutes?—Yes, he might; he was a weakly man, and had bled a good deal about a year before, and he had not had his blood properly renovated afterwards. The things around the limb were saturated with blood, so that he must have bled a good deal. Of course he had been well attended to under the circumstances, but it was evident he had not been handled by skilful hands.

1663. (*Mr. Greaves.*) Have you ever noticed that the men go to work very often, and continue to work, when they have got a cold, and when they ought to stay at home to nurse themselves?—Yes.

1664. And that would account for many of the cases of pneumonia, and so on?—Yes, pneumonia, as a rule, comes on insidiously. The man is out of sorts for days before the real pain and chill takes him.

1665. I suppose your contention that dust is usually injurious is conjecture more than anything else?—No; it is not.

1666. You have no direct evidence, have you?—I have direct evidence by statistics throughout the country relating to all dust-inhaling occupations.

1667. But not as regards the quarryman particularly?—No.

1668. You have not examined the quarryman's lung?—No; we are not allowed to make a post-mortem examination.

1669. Can you account for the scarcity of houses here now?—There has not been much building going on here; I have heard that the land cannot be leased.

1670. You say it would be a great advantage to institute ambulance lectures?—Yes; I think it would be very desirable.

1671. In your opinion would the distribution of pamphlets on "first aid" be useful?—Yes, they would undoubtedly, provided they were not too elaborate. If the instructions given were simple, they would be very useful.

1672. Has that been done at the quarries?—Yes, I remember it was done about eight or ten years ago. Dr. Foster inaugurated the lectures.

1673. And in your opinion these pamphlets would be useful?—Yes, if they are prepared in Welsh, but they would be of no use without proper appliances. The appliances ought not to be kept at the office as at present. They should be kept on the spot, so as to be as near as possible when they are wanted. It is no use keeping them at the office.

1674. (*Mr. Evans.*) Have you compared the death rates from respiratory diseases amongst the females with those amongst the males in this district?—Yes, and I have given the figures in my statement. The deaths from diseases of the respiratory organs amongst the males are exactly double those amongst females. In the former case, the percentage is about 49 per cent. of the total number of deaths, and in the latter 24 per cent.

1675. So that the per-centage of males is double that of females?—Yes, from those diseases.

1676. In arriving at those figures have you taken the working ages?—Yes, I have only taken working ages.

1677. What ages have you taken?—From 16 years of age. There are none under 16.

1678. And did you take the females of the same ages?—Yes.

1679. It is your strong opinion that dust does affect the health of the quarryman?—Yes, it does, undoubtedly.

1680. You say you have no post-mortem examination to guide you?—No, we have not.

1681. Have you anything else that would fortify your opinion on that point,—can you name anything?—Comparing the percentage of deaths amongst quarrymen with the deaths amongst others who inhale matters in the air, such as wood-dust, or wool-dust, or cotton-dust, you will find that statistics prove that the rate of mortality among stonemasons and quarrymen is double that in those classes.

1682. Have you made any examination of slate-dust as compared with other dust, such as granite?—No, I have not. Slate dust is sharp and angular in comparison with others. I saw some of it to-day under the microscope and the angularity was very marked. You have colliers dying from chest diseases as well as the quarrymen, but the proportion among colliers is very small compared with quarrymen. This, I believe, is accounted for by the fact that coal dust is round and soft, and consequently not so irritating to the mucous membrane of the air passages.

1683. (*Mr. Jones.*) With regard to the death rate among the quarrymen, were you taking the figures for the district?—No, I took the figures relating to my own patients.

1684. (*Mr. Greaves.*) So that you are only speaking of your own patients?—Yes, that is all.

1685. (*Mr. Jones.*) But in your answer just now to Mr. Evans were you referring to the quarrymen throughout the kingdom, and did you include granite and other quarries?—Yes, I referred to the general statistics for the United Kingdom, which include granite and slate quarries.

1686. And when you were comparing the colliers with the quarrymen, were you taking into account the altitude that the quarryman works in?—I was talking to a medical gentleman last night who had been in the Rhondda Valley for two years. The altitude there, is, of course, not so high, but this gentleman told me he had not seen one death from consumption amongst the men there in that time.

1687. (*Mr. Evans.*) In the statement you made to us you did not refer to the quarrymen generally, but to your patients only?—In my statement I gave the average age and the per-centages and so on amongst my own patients.

1688. So you did not speak at all for the whole of the quarrymen?—When I said that the rate of mortality of quarrymen and slate-makers was higher than those in other dust-inhaling occupations I was referring to the kingdom generally.

1689. Did you make any distinction between the slate-makers and those working underground, or can you give us any figures on that point?—No, I have no figures with regard to that, but speaking from memory I believe that most of my consumptive cases were shedmen, but most of my pneumonia cases were underground men.

1690. And you have no doubt in your own mind that you have traced cases of typhoid fever to the drinking of impure water?—Yes, I have mentioned two cases which Dr. Rees and myself investigated, and we could not trace it to anything else than the men being in the habit of drinking water dripping down the rock.

1691. (*Mr. Jenkins.*) Your statement is based on the counterfoils of your death certificates?—Yes, upon my own death certificates for the last 10 years.

1692. What proportion does that bear to the whole of the quarrymen in the district?—Do you mean to the whole of the deaths in the neighbourhood?

1693. What proportion do they bear to the total number of quarrymen?—I have not made any calculation of that kind. I have simply gone through the counterfoils of my death certificates and found, for instance, that half of my deaths were due to diseases of the respiratory organs, and so on with the other diseases.

1694. And is that proportion of 50 per cent. from respiratory diseases a large proportion?—Yes, it is unusually large.

1695. What is the proportion of the men attended by you as compared with the total number of quarrymen in the district?—I have about 1,000 men who pay me monthly.

1695*a*. Out of a possible total of how much?—Out of a possible 3,500.

1696. That is about the total number of quarrymen in Festiniog?—Yes, I believe so.

1697. Therefore, the number of men you have is a large proportion?—Yes, it is.

1698. Would you make it a rule in these quarries, as is the case in the coal mines, that bandages and so on be provided for the use of the men?—Most certainly I would, and appliances for stopping bleeding, and so on, They should be kept in different parts of the works underground, and also in the sheds, and not merely in the office.

1699. (*Mr. Jones.*) You mean that they should not be kept in the quarry office alone?—That is so. They should be convenient for immediate use.

1700. (*Mr. Jenkins.*) I think you said that out of a total of 157 male deaths, 78 were due to diseases of the respiratory organs?—Yes.

1701. Do you include deaths from pneumonia in that 78?—Yes.

1702. Do you think that a weak chest, caused by the inhalation of dust, has a tendency to develop into pneumonia?—No, not into acute pneumonia. It may to a low form, but not to pneumonia as we speak of it. At least, I do not think so.

1703. (*Chairman.*) Are we to understand that the whole of the 157 are quarrymen?—Yes, they are the deaths of quarrymen exclusively.

1704. Have you compared the quarrymen with the non-quarrymen?—No, I have not. The non-quarrying class represents a very small number. We have really very few in this neighbourhood outside the quarrymen.

1705. The number would be too small to enable you to draw a fair comparison?—Yes, quite so.

1706. You have referred to rheumatism?—Yes.

1707. How can that best be prevented?—By wearing flannel, and that should be kept dry, as far as possible, and changed oftener than is the practice among the men generally. I fear that the general custom is for the men to work in two or three coverings of flannel, and to change only about once a fortnight. The result of this is that the flannels get cold and clammy, and the effect cannot but be injurious.

1708. (*Mr. Greaves.*) And he generally goes to bed in the same shirt that he works in?—Yes.

1709. And he keeps it on for a fortnight?—Yes. I believe it is a matter of habit, and for want of being properly taught. They think it is unsafe to change their flannels. They seem to be afraid of air or water getting into contact with their skin, apart from their hands and face.

1710. (*Chairman.*) Do you think the quarryman suffers from drinking bad tea?—I believe they drink too much tea, and that the tea they drink is not properly infused, but I do not think myself that half the indigestion is due to tea drinking.

1711. But some of it is, you think?—Yes, a great proportion of it.

1712. (*Mr. Jenkins.*) Have you taken special notice of the miners?—Yes. I have had three or four miners this last fortnight under my care. I have no statistics on the subject, but I believe the miners are more subject to what we call emphysema than the rest of the quarrymen. I saw two last Sunday, and both had marked emphysema. I made inquiries as to the place they worked in, and found they had worked for 30 or 40 years in levels.

1713. Have you made any inquiries as to the attitude of the body when the men are working?—No, I have not.

1714. Would you attribute the two cases of illness you have just referred to, to the inhaling of dust?—I would attribute certain forms of the complaint to inhalation of dust. I think that can be satisfactorily explained.

1715. Have you visited any parts of the quarries?—Yes.

1716. Were you in the underground workings?—Yes.

1717. What time of the year was it?—I do not remember. They have been so very rare, like angels' visits. I do not think I have been there more than three or four times altogether.

1718. Have you visited them at a time when they were very damp and smoky?—If I remember rightly, I have been in a chamber when the place was full of smoke. I understand that they are generally damp; I

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fear that many of the men work in dampness. Their feet get soaked in walking along. There are holes full of water, and the men often get their feet wet before they reach their chamber. I remember noticing pools of water here and there in the chambers.

1719. For how many hours do you think the men ought to work in such places?—I think that eight hours ought to be the highest limit for underground working, apart from dampness.

1720. Eight hours ought to be the limit all round?—Yes.

1721. (*Mr. Evans.*) Do you consider that it is a very injurious thing for the men to get their feet wet and work in that condition?—Yes, it is very injurious.

1722. And you consider that these things should not be tolerated?—I should say not, if they can be prevented in any way.

1723. You are aware, by report of the men, that such is the case in some of the quarries in Festiniog?—Yes, there is no doubt about it. The men can be seen returning home, even on a dry day, with their trousers wet. Very often they work in chains, and you have the rock slanting at a certain angle, and the water dripping. The man really works on a damp rock, and such a state of things cannot fail to be detrimental to his health.

1724. Which do you consider the most numerous—the injuries from things falling from above, or from rock slipping?—Indeed I have never kept any record, and cannot say anything on that point. The greatest number of injuries to the head I have had during the last three months have been crane accidents.

1725. (*Mr. Jones.*) I gathered from what you said at the commencement that the largest number of injuries is due to rock-slipping?—Yes.

1726. That is the impression your statement gave?—Yes. The men get a rock loose by blasting, and then they go into a wrong position and the rock falls down upon them. I believe that is often due to the negligence of the men, or to their want of skill.

1727. You were speaking just now of the dampness of the levels?—Yes.

1728. What about the droppings from the rock?—I think that it is most injurious to the men who live on them, as it were, all day. In a great many bargains, I understand, they lie on them all day.

1729. (*Mr. Greaves.*) Standing on them?—Yes.

1730. (*Mr. Evans.*) Do the men lie or stand?—From what I understand, they are lying part of the day.

1731. (*Mr. Jenkins.*) Have you frequently heard men complain that they work on rocks which are streaming with water?—No, I have not heard of that, but I have heard of men working on rocks which were very wet.

1732. Not streaming?—I have not heard that.

1733. But if they do work in places of that kind what would be the effect?—The effect perhaps would be pneumonia or rheumatism in its various forms. I believe a great number of underground men suffer from chronic rheumatism. They get very stiff about the joints, and they often suffer at an early age from rheumatic arthritis.

Mr. R. Roberts.

Mr. ROBERT ROBERTS examined.

1734. (*Chairman.*) You live at Blaenau Festiniog?—Yes.

1735. And you are the resident manager of the Oakeley quarries?—Yes, I am.

1736. How long have you been a quarry agent or manager?—For about 21 years.

1737. Are the Oakeley quarries the largest in the district?—Yes, they are.

1738. About how many men do you employ?—About 1,650.

1739. That would be very nearly half the quarrymen at the underground quarries of Merionethshire?—That I cannot say, but it is not very far from it, I believe.

1740. It is somewhere near the half?—Yes, it is.

1741. I believe you have drawn up some notes for the benefit of the Committee?—Yes, I have, and I have arranged what I have to say under different headings.

Prevention of falls.—In my opinion the best means of preventing falls from the walls and from the roofs is for the management and the workmen to exercise all the care possible, the workmen on all occasions to make safe their respective working places before they leave them; frequent inspection to be made by both the management and the workmen; in fact the special rules should be carried out with care and attention by both the management and the workmen, special attention being paid to rules 48, 82, 83, and 85, which read as follows:—

Rule 48. Managers, assistant managers, and foremen. "He shall specify the width of the chambers or "openings in the slate vein, and the width of the "pillars between the chambers, and shall see that the "proper proportion of pillar is not lessened as the "work progresses. Should any pillar show signs of "giving way or falling, he shall either withdraw the "men or see that sufficient measures are taken for "their safety. He shall see that the roof of each "new chamber is left in a safe condition by the "*miners* before any slate is allowed to be worked "underneath."

Rule 82. Miners, rockmen, quarrymen, and all other work-persons. "He shall before commencing "work, and during the course of it, especially after "blasting, make a careful examination of his working "place and remove any loose rock, stones, or ground "that might be dangerous."

Rule 83. "He shall not leave open any rail or other "fence at the top of any shaft nor below ground at "any entrance to any shaft from any level, cross-cut, "or such like place between the top and bottom of "any shaft, nor on any bridge, nor at the entrance "to any disused bridge, or dangerous opening; and "he shall report to the assistant manager when he "observes that any fence to any of the above-men-"tioned places is wanting or insufficient."

Rule 85. "He shall not put anything in the way of "the air-current, or disarrange any appliance for "directing the ventilation of the mine, or any part of "the mine. If the air be slack, so that candles will "not burn freely when placed upright, or if he perceive "any unusual quantity of water, or any insecurity of "roofs or sides, or of other parts of the workings, or "any breach of the Acts, or of these rules, or any-"thing that may appear unsafe or likely to produce "danger, he shall forthwith report it to the manager, "assistant manager, or foreman in charge, who shall "not allow work to be resumed, save in cases of "emergency, until proper ventilation has been restored "or the place made secure."

But to stop falls altogether is, in my opinion, impossible, because they are brought about by natural causes and forces which are, in my opinion, inherent to underground mining. For instance, the output from underground operations alone at the Oakeley slate quarries since the amalgamation in January 1888 amounts, in round numbers, to 4,500,000 tons. This, in my opinion, must of itself be a disturbing element within the mountain, because the method of working means removing (roughly speaking, 60 per cent. of the mountain) that which nature has provided for its support, and which is inseparable from the chamber and wall mode of underground mining. I am of opinion also that no better mode of underground mining of slate quarries can be adopted with the slate formation lying at an angle of 30 or 31 degrees in the Oakeley quarries and its pillaring line bearing about 13 degrees east of north.

Each chamber, in getting deeper (by "deeper" I mean being wrought towards the underlying "hard"), and longer, would tend to cause a movement; but more especially in faulty ground, jointy rock, the faces of "bevels," and at and about the faces of all "slants"; and, moreover, the pressure or weight of the mountain above, which the walls have to carry, would tend to and bring about "scribing" or scaling of "walls," aggravated by vibrations, brought about by blasting.

Inspection.—The inspection of slate quarries should, in my opinion, be left to the supervision of one department, and not as at present. At present the supervision of Dr. Foster and Mr. Richmond, the Factory inspector, overlap and tend to misunderstanding and some confusion. With a slight re-organisation, I fail to see why the factory inspector, the explosives inspector, the inspector of weights and measures, and the detonator inspector, should not be merged into one,

in so far as the slate quarries are concerned, *i.e.*, under the Mines Regulation Act.

Special rules.—Rule 73, in my opinion, should be modified. I would suggest that the rockmen should not be compelled to use wooden rammers except when using gun-cotton or gelignite.

Greatest vertical height.—The greatest vertical height of chambers is about 220 feet (*vide* section which I put in Plate V.), and the greatest thickness of our principal vein is about 180 feet.

Alleged undercutting of walls.—Were the walls cut on the natural line of pillaring it would come to 1 in 4, or 1 in 5 from the vertical line.

Number of chambers, and average length of platforms and of walls.—With the view to show you the extent to which the mountain is honeycombed, I will give you the number of chambers in the Oakeley quarries. The total number of chambers is 569, and the number in working is 149. The platforms (*see* question 1754) vary in breadth from nil to about 100 feet in a few cases on I and K floors, and the walls vary in length from a few hundred feet to 1,000, 1,500, 1,800, and 2,000 feet.

Accidents.—I have tabulated the accidents at the Oakeley quarries for the last three years, as follows :—

Cause.	Non-Fatal.			Fatal.	Total.
	Lower.	Middle.	Upper.		
Explosion - -	10	4	2	—	16
Crane accidents -	4	6	5	—	15
Stone from fore-breasts	3	3	2	1 (Lower.)	9
Wagons and sleds -	4	3	1	—	8
Rolling of stones in fall.	2	2	2	1 (Middle.)	7
Falling from and over fore-breasts.	2	—	3	—	5
Falls from walls -	—	—	1	3 (Upper.)	4
Inclines and machinery	3	—	—	—	3
Pieces from blasts -	2	—	—	—	2
Bursting of water-gauge	—	1	—	—	1
Miscellaneous - -	—	1	—	—	1
Falls from roof - -	—	—	—	—	—
	30	20	16	5	71

I give the figures for the last three years, because it it is only during that time that I have entered them in a book, where I can always get at them easily.

Inquests.—I am of opinion that slate quarry managers should be allowed to attend inquests, and be allowed to put questions to witnesses as a matter of right, in the same manner as colliery managers are allowed to do in the Coal Mines Regulation Act.

Hospital.—The hospital is kept up at the expense of the company, the workmen who meet with accidents at the quarries being admitted free of charge. The number of beds is 12.

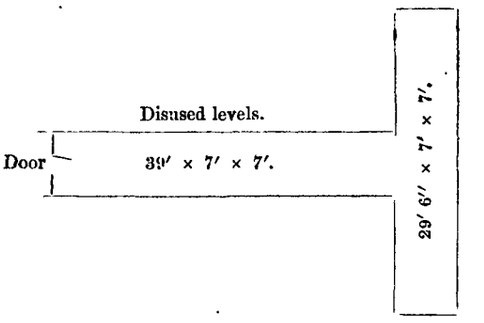
Inclines and bridges.—Printed notices, both Welsh and English, are put up. With regard to the inclines, the English copy reads: "No one is allowed to be on "the incline whilst it is in working," and the English copy with regard to the bridges reads: "Not more "than one loaded truck at a time will be allowed to "pass over any one of the bridges."

Enforcement of special rules.—I have experienced a great deal of difficulty for years in carrying out the present special rules; but of late years, I am pleased to say, the special rules are now respected and adhered to much better. For breach of special rules, I fined in 1891, 15 men 2*s.* 6*d.* each; in 1892 I fined 34, 2*s.* 6*d.* each; and in 1893 I fined 25, 5*s.* each, and summoned 4. In 1893 I advanced the fine from 2*s.* 6*d.* to 5*s.*, because I found a fine of 2*s.* 6*d.* did not produce the desired effect. As a rule I give the offenders the option of being summoned, or of being fined by me. The fine money is divided at the end of each year between the widows of those men killed at the quarry. A list showing the distribution of the fine money is put up in the principal dining rooms.

Certificated Managers.—All future applicants for slate quarry management should, in my opinion, be certificated, the examination of candidates to include practical knowledge of quarrying, some knowledge of surveying, of physics, and of practical geology. Technical schools are, or should be in the immediate future, within the reach of all. No doubt chambers have been badly laid out, and a great deal of undercutting of walls has been done, from want of knowledge of surveying or of dialling. To bear out my statement I will, Mr. Chairman, with your permission, quote from the report for 1876 of your late colleague and predecessor, Mr. Fanning Evans. In that report he says, "I am assured that the art of dialling is so generally "ignored among them" (*i.e.*, quarry managers) "that "instances of men passing each other when attempting "to hole through from one level to another have been "of frequent occurrence." I wish it to be understood that I cast no reflection on the present or past quarry managers, because, until recently, education was very much neglected in these mountainous parts and out-of-the-way corners in Wales.

Boilers.—All the boilers at the Oakeley quarries are insured in the Boiler Insurance Company Limited, and their system speaks for itself. It is thus described: "Our system is to examine each boiler as far as "practicable, both internally and externally, once per "annum at times most convenient to the insured. "This we term a thorough examination, the boiler "having been previously laid off, the plates inside and "outside thoroughly cleaned, all soot removed, and "the flues swept. Where boilers, owing to their con-"struction, cannot be properly examined in the usual "way, we substitute a test by hydraulic pressure. The "boilers and fittings are also examined, while working, "at intervals of three to four months, an official "report being forwarded to the insured after each "inspection, giving definite information as to the "condition of the boilers, and pointing out any repairs "or alterations that may be deemed necessary." . . "We will periodically inspect the boilers at intervals "of from three to four months, and we will guarantee "to examine them thoroughly at least once in the "year."

Dining rooms. — At lower quarry there are three dining rooms to accommodate about 80 men each; and below ground there are three eating places; one of these will accommodate about 60, but at present only 55 men who use it; another will seat eight, and another will seat seven men. Two are on K floor, and one on I floor. The following is a sketch of the one to seat 60 men, which is on K floor:—



This eating place is warmed by means of exhaust steam passing through a pipe along the length of it. The floor is of concrete. The number of cubic feet is 3,356, and it is well ventilated at the three ends.

At our middle quarry there are two dining-rooms above ground, to accommodate from 60 to 80 men each, and one eating place, to accommodate 30, below ground.

At the upper quarry there are five dining-rooms, all above ground.

Rooms for drying clothes.—For the men who work above ground—in the "fall," for instance, and at the tips —we have cabins for drying clothes; but we have not provided for those who work underground, and in the sheds above ground.

A deputation on behalf of the men in the two sheds at the Oakeley Middle quarry came to me some time ago, consisting of Owen Parry and William Lewis Jones, with the request that they should have their clothes dried in the dining-room. I replied "Certainly not, "because if I allow it you will inhale impure air at "your meals, and possibly germs of infectious diseases." I was next asked to put up a cabin for drying clothes. In reply I said: "Permit me to relate to you my "experience with regard to the question of drying "clothes. About two years ago water in large quan-"tities percolated through the roof of chamber Y on "floors 11 and 12 of the upper quarry. I noticed one

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"day that the workmen in these chambers had wet "clothes on. I spoke to one, of the name of William "H. Williams, on the subject, and reminded him that "unless he took more care he would most certainly "undermine his health. He replied, 'But we cannot "'help ourselves, the chamber is so very wet.' I said, "most certainly you can; and, I added, will you and "your comrades undertake to bring your clothes "down to the round cabin on the tenth floor if I put "fire there to dry your clothes? The reply was 'Yes.' "The workmen brought their wet or damp clothes "there for a short time and then discontinued doing so. "However, I said to the deputation, if you, by way of "experiment, will wall up a small cabin, I supplying the "timber, and fuel, and a man to see to the fire, and if "I further see that you will make use of it, and appre- "ciate it, I will undertake to put up a more elaborate "building for you." The walling for the hut, or cabin, has not been put up yet, and I suppose never will be put up.

Privy accommodation.—We have nine privies, which, I think, on looking at the question all round, is not enough. Below ground exhausted chambers, away from the working places, are used by the workmen; above ground the tips, which cover an immense area, are used, and with the heavy rainfall we have, amounting to about 100 inches a year, the excreta are quickly washed off, so that practically we suffer from no nuisance.

1742. (*Chairman.*) One point on which we have had evidence is with regard to the supply of drinking water to the men. Have the men a sufficient supply of pure drinking water?—Yes, they have.

1743. And is it easily accessible?—Yes.

1744. Are they obliged to drink the water trickling down the quarry, or dropping from the roof?—They are not obliged to.

1745. But is that the most convenient supply for them?—For those who work underground, and who consider it too much trouble to go outside, of course that is the only water for them to drink.

1746. With regard to the privy accommodation, or the want of it, do you think that the men working in the chambers suffer at all from exhalations coming from disused chambers to which they resort?—I do not think so.

1747. Have you ever noticed bad smells in the working places?—No, not in the working places, certainly not.

1748. You say that you think slate is worked upon the best possible system that can be adopted?—Yes.

1749. Are you aware that in Northern France veins resembling these are worked on a different system?—I read your notes on that system some years ago—the notes which appeared in one of your reports. That is all I know about the system.

1750. Yesterday some of the men complained that after charging holes with powder they were obliged to go back to their chest by an inconvenient or dangerous path in order to stow away their bugle or horn immediately, and that it would have been safer and more convenient for them to have deposited that bugle temporarily in some place, instead of being obliged to take it back to the chest. Is it a fact that a man is obliged to put his bugle back in the chest the moment he has finished his charging?—I have never personally compelled anyone to do that, but of course I cannot speak for my assistants.

1751. Have the men never complained of that to you?—No, never. I qualify all these rules with the expression, "What is reasonably practicable." One of the rules reads thus: "The manager or assistant manager," and so on, "shall, so far as is reasonably practicable."

1752. Do those words govern the whole of the special rules?—I take it that they do. Rightly or wrongly, that is how I understand them.

1753. And have you acted on that supposition?—Yes, I have.

1754. Might I ask the meaning of the word "platform" that you used in your statement?—We cut the mountain up into so many galleries, and the spaces between each fore-breast we call "platforms.'

1755. You mean the height from one floor to the next floor?—Not the height.

1756. How would you describe it?—The space from the bottom of one fore-breast to the top of the next fore-breast following on the floor below.

1757. Do you think that the rock becomes more dangerous as you descend in depth?—The walls have to carry greater weight.

1758. But is not the rock more solid as you go down?—In many instances it is so, but it is the "scribing" and scaling that we have to contend with, and these are the great sources of danger.

1759. Do they "scribe" or scale off more as they get deeper?—Yes, that is my opinion.

1760. You have mentioned that you think it desirable that the managers of quarries should have the opportunity of being represented at inquests, or of appearing there?—Yes.

1761. Would you think it desirable that the whole of the rule contained in the Coal Mines Regulation Act should be made applicable to slate quarries; the provision which gives liberty to the men to appoint a person to attend on their behalf?—I do not remember the whole of the rule.

1762. These provisions are contained in the Coal Mines Regulation Act of 1887, sect. 48 (8), and read thus:—"Any relative of any person whose death "may have been caused by the explosion or accident "with respect to which the inquest is being held, and "the owner, agent, or manager of the mine in which "the explosion or accident occurred, and any person "appointed by the order in writing of the majority of "the workmen employed at the said mine, shall be at "liberty to attend and examine any witness, either in "person or by his counsel, solicitor, or agent, subject "nevertheless to the order of the coroner." What do you think of that provision?—I think it a very good one.

1763. You would like to see a similar provision inserted in any amendment of the present law?—Yes, I would.

1764. With regard to the insurance of the boilers in the society you have named, I gather that you are decidedly of opinion that you derive benefits from the inspections made by that society's representatives?—We consider the boiler inspectors experts in the business, and therefore are more or less guided by them, and they protect us. If there is anything wrong with a boiler it is reported, and of course the matter is seen to at once.

1765. And are you able to get hints from them of a commercial value as to the saving of coal, and so on?—I have no recollection of anything of that kind having taken place.

1766. But as to safety, you are certain you derive considerable benefit?—Yes, I am.

1767. As to eating-houses, there are a number of them at your quarries, I believe?—Yes.

1768. Is there accommodation in them for all the men?—No, there is not, and for the reason that they would not make use of them if they were provided. For instance, there is one on the C floor which is not full. There is room in it for more. If we knew that the men would make use of them I do not think that the Company would hesitate for a moment to put up more of them, but the men have never represented the matter to us in any way.

1769. Then I gather that as far as you are aware, you have provided all the dining accommodation that the men wish for?—Yes, that is so. There are many men in the quarries who will not avail themselves of what we have there at the present moment. They prefer to eat apart from the rest of the men. What their reasons are I cannot say. Their tea, and so on, they prefer to warm over a candle underground, rather than come up to the dining-room. Many of them prefer that, and they do it.

1770. (*Mr. Greaves.*) We have heard, and we know as practical men, that one of the dangers arises from the roofs and pillars?—Yes.

1771. Can you inform the Committee what method you adopt in your quarries for the examination of the roofs and pillars?—We go round with the Wells light, which is the best light we know of, and make frequent examinations, and in case we find anything that looks suspicious to the eye, or that is considered dangerous by the men, we put up ladders forthwith, and have a thorough examination, not only by means of the Wells light, but by means of ladders as well.

1772. Does that inspection take place at certain fixed intervals, or only when the men complain?—We do it ourselves of our own accord, apart from any complaints from the men. We make independent inspections apart from any complaint brought to our notice by the men.

1773. (*Mr. Jenkins.*) You do that whether the men have complained or not?—Yes.

1774. (*Mr. Greaves.*) When you find the roof or pillar unsafe, what means do you adopt of improving matters, or of making that portion of the quarry safe?—We put up ladders and bring down what appears to us to be loose or dangerous.

1775. You test it with the hammer?—Yes, we do.

1776. Of course, as we all know, the present ladders are rather cumbrous?—Yes, they are.

1777. Can you suggest any other means which could be adopted?—I cannot. Whilst you are on the question of ladders, I should like, with the permission of the Committee, to put this account (*produced*) in. I think you asked one of the witnesses (Robert Davies) a question as to a certain ladder which was put up in chamber 16 in the Lower Quarry, and you got from him the reply that it took them four days to put the ladder up. I should like to supplement that answer with the following notes:—

COST OF SECURING THE ROOF OF CHAMBER 16 ON FLOOR K.

(Square yards inspected and secured, about 200.)

	£	s.	d.
Preparing ladders and raising same, 4 men for 4 days, at 5s. per day	4	0	0
30 men for half hour, at 4s. 6d. per day	0	9	0
Stoppage indirectly of 100 men for half hour	2	10	0
16 days inspecting and securing, for 7 men	28	14	9
Wells light oil	3	0	0
Rope sold at half price	4	4	0
30 men lowering and raising ladders at different times and stoppage of floors	3	0	0
	£45	17	9

The cost of inspecting and securing 200 square yards was therefore 45*l.* 17*s.* 9*d.*, which is equal to 4*s.* 6*d.* per square yard. With regard to the item "rope sold at "half price," I should like to explain that we invariably take a fresh rope from the stores for putting a long ladder up, and after we have finished with it we sell it at half price.

1778. (*Mr. Greaves.*) That is a table of the cost of inspecting one roof?—Yes.

1779. On one occasion?—Yes.

1780. (*Mr. Jones.*) What about the stoppage of the floor—do you include the loss from that?—Of course I do, because it meant loss of time and money.

1781. And that is included in your figures?—Yes, it is.

1782. (*Mr. Greaves.*) Is a record or diary kept of each inspection that is made?—There is.

1783. And also of any report that is brought by any of the quarrymen as to any danger in the workings?—I do not know that we make a record of that.

1784. Do you keep a diary?—I do.

1785. To which you could refer at any time?—Yes.

1786. Which bridges do you consider the most secure?—The kind we have now.

1787. How are they made?—We have them both ways. We fasten them to the clay-slant, and we truss them with iron rods underneath.

1788. Which method do you consider the best?—The trussing. I think that is the better of the two.

1789. What is the length of your longest bridge, can you tell me?—It would be 55 feet, or thereabouts, I think.

1790. And what is the maximum load you put on one bridge?—2½ or 3 tons. We do not allow more than 3 tons.

1791. Have there been any accidents in your quarry with bridges, of late years?—Yes, there was one about six years ago.

1792. But that was not a defective bridge?—No.

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1793. It was from another cause, I believe?—Yes.

1794. We have heard a great deal as to the dust in the slate mills, and of course there is a certain amount of dust always arising. Can you suggest any means by which it can be lessened or rendered less of a nuisance?—You might run a pipe along the length of the shed and cause a spray to play on the dust, but personally I think I would rather have the dust than work in a damp place. There would be dampness produced by the spray.

1795. Your opinion with regard to the special rules is that they are adequate?—Yes, that is my impression.

1796. Or that they might be altered in a few instances, especially in regard to the wooden rammers?—Yes.

1797. Otherwise they are very full and complete?—Yes. If you make them more full the men will revolt against them.

1798. Every effort is made in your quarry to enforce those rules?—Yes, certainly.

1799. (*Mr. Jones.*) You have made allusion to rule 48, as to pillars and new chambers?—Yes.

1800. Do you make any preparation before you commence a chamber and before the clay-slant goes out of reach by putting anything there so that you may have an opportunity of examining that floor again. Supposing that you put a block here and there along the side of the pillar, do you not think that a rope hung over it would help you eventually to get at the roof—if you put two rows of them on each side of the chamber, would they not be of assistance to you hereafter when you get the chamber down to say 10 or 15 or 20 yards? I mean proper metal blocks with metal ropes or wire ropes, to help you to raise up the ladders and inspect the pillar and roof?—Of course it would be of assistance in raising the ladders, but to my mind it is very doubtful whether you would benefit at all by the method in the long run.

1801. What are your reasons for saying that?—My experience, from what I have seen in raising these ladders, is that we want the blocks on either side of the chamber. We lash the ladder on the floor, and then we put a block or two on each side. I fail to see, as you recede from the clay-slant, how you are to get there except by means of the appliances I have just mentioned on either side of the chamber. If you were to put a chain or a rope, as you suggest, it would be liable to be damaged by a stone from a blast, and in other ways, and probably it would be cracked, if a chain, so that in making use of such a thing as a chain under those circumstances, you would, perhaps, bring about a very serious accident.

1802. But apart from that, you would not think of putting that chain or rope, or anything else you might have, except to assist in getting up. You could very easily get a rope across the chamber, and with two rows of these blocks within 7 or 10 yards apart you could get your whole chamber netted by ropes?—Yes, I see your meaning.

1803. Could you not adopt that plan, do you think?—In theory, no doubt, it sounds well but I very much doubt the value of it when it is reduced to practice.

1804. Let us reduce it to practice, and say what you think of it; we are both practical men. Can you bring forward any valid objection to it?—I should like you to show me how you are to get at the block except by means of a ladder. Can you suggest to me a way to put up a ladder against the supposed blocks in the roof or walls.

1805. You always have a copper wire running over those blocks, and you always have one end close to. You may thus draw a strong rope over, and in half an hour you could go anywhere. You have two ropes, say, along both sides of the chamber, and you might put them anywhere and everywhere?—Yes.

1806. And if you think fit you may drop one end of this copper wire to every level along the side of the pillars, so that you may get at them anywhere. Do you not think if you did that at the commencement it would lessen your labour immensely later on?—My impression is that were you to leave those copper wires in the manner suggested they would be knocked about and broken to pieces by blasting.

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1807. But if they were you could repair them in a day?—I fail to see how you could repair them except by using ladders in the usual way.

1808. But you would have two or three together, and it is most unlikely that they would all be broken?—I cannot agree with you there.

1809. Have you tried it?—No, I have not.

1810. As far as I am concerned, I believe the Committee have no clear idea of the extent of the slate workings of Festiniog, and for the sake of the Committee and of everybody concerned I should like you very much to give us some idea of the area of your underground workings, say the area of the clay-slant?—I am very sorry to say that I am quite unprepared for that at the present moment, but I or my assistant, Mr. William Owen, will be very pleased to supply that information further on.

1811. Another question I should like to ask you is what is the area of what you leave behind?—You have stated that you have removed about 60 per cent. of the support of the ground, and on behalf of the Committee and for their information I should like to ask, what do you leave remaining there, and what is the proportion between the existing area and what you take away?—If I understand the question, the answer is that the width of the walls vary from about 30 feet to 60 feet.

1812. If we had the information I have asked for we would be able to see at once what the total area is that you are leaving to support the roof?—Yes.

1813. You say you are not prepared to give the information now?—No, I am not.

1814. Then you will give the question to your assistant, Mr. William Owen?—Yes, with pleasure. Of course it will take time to get out.

1815. Can you furnish the Committee with reduced plans of your workings? I am not asking for anything with the view to injuring you in any shape or form, but simply to assist the Committee, and I am sure you are the one we can apply to for assistance. I do not care how simple it will be, just something to show the extent of the workings of the Festiniog quarries, as far as you are concerned?—I should not like to answer that question in the affirmative without consulting my managing director, Mr. Dunlop. He is present and has heard your question.

(*Mr. Dunlop to the Committee.*) I shall answer that question for Mr. Roberts. We shall be only too pleased to supply what has been asked for, and any other information that may be required.

1816. (*Mr. Jones to the Witness.*) Would you as well have two sections made, one along the pillars, and the other right along the workings?—In front of the workings.

1817. Yes, just to show the size of the workings and the size of the pillars. I only want to make things clear in the report?—Yes, I will do that with pleasure.

1818. A question was asked, I believe, whether you considered the rock down at the bottom of the floors stronger to bear pressure than it is higher up?—Yes, there was a question to that effect.

1819. Can you give me an answer to this question—supposing that the slate rock is solid, can you give us any idea what amount of pressure will crush a certain quantity of it, say a square foot?—I anticipated that question, and I am more or less prepared for it. The roof is a beam roof, supported by walls on both sides and by its internal thickness and solidity. According to Mr. W. H. Barlow, the eminent engineer, of 2, Old Palace Yard, London, with 300 feet of rock, and walls of 30 feet thick, the pressure would be about 77 tons per square foot. Slate cut at right angles to the cleavage bears 1,258 tons to the square foot before crushing. Slate on its bed bears 1,064 tons on an average to the square foot before cracking. Slate is strongest when the pressure is brought exactly at right angles to the line of cleavage. At right angles to the cleavage it bears 320 tons to the square foot before cracking, but at an angle of 45 degrees to the cleavage it only carries 328 tons before crushing.

1820. What do you mean by the 320 tons, will you explain that? I want to get at the "scribe." That is what I am driving at?—That slate rock will not "scribe" or crack with a pressure of 320 tons per square foot.

1821. Have you got that kind of pressure?—We have the mountain above, which means great pressure, so that there is "scribing" as a matter of course.

1822. What angle does that "scribe" take to the line of pressure?—I am not quite certain about that.

1823. Can you not guess it from these figures?—I prefer not to guess it.

1824. Is it within your experience that you find it generally at an angle of 45 degrees to the line of pressure?—Slate is weakest, according to these figures, at an angle of 45 degrees, and strongest at an angle of 90°, or a right angle.

1825. If the pillars will carry a load of 1,200 tons per square foot, you are loading them at 300 tons. What is the load that you intend to put upon a pillar? You gave us an instance of a solid piece of slate?—That I have not gone into, so that I cannot tell you what the walls really carry. It means a huge, big survey.

1826. But I do not want that. You put the pillar of a certain size, and the chamber of a certain width, and you must have had in your mind the amount of rock that each pillar would have to carry?—We have "bevels" and dislocations of various kinds to contend with.

1827. I want you to tell me the practical load that you intend each pillar should carry, taking into consideration all the joints and all the "bevels" and everything else?—You gave it to us theoretically. What do you consider that a pillar ought to carry as an average working load?—I cannot tell you, because there are so many local disturbances and dislocations which are invisible to the naked eye that I cannot possibly say. All these are factors to be taken into account, and I should be very sorry to answer the question.

1828. But you are laying out the ground and taking all these things into consideration?—Yes.

1829. What are the real forces that you have to contend with in your workings; how many are there, and what are the most important that you have to fight with in your underground workings?—Weight, I should think, and vibrations from blasting.

1830. As to vibrations from blasting, what injury do they cause, and how do they affect you?—When we have a jointy rock, or where a rock that has scaled, the vibration brings the loose rock down.

1831. Can you give us the reposing angle of slate rock?—I can only give it to you as a matter of opinion.

1832. You do not know it as a matter of fact?—No, I do not.

1833. Would you be surprised to see it between 20° and 30°?—I was going to suggest 25 degrees from the horizontal.

1834. That is a good average, and it depends upon the surface?—Certainly.

1835. Have you any angle as low as 25° at your quarry?—No.

1836. Say the clay-slant?—That is, 30 or 31 degrees from the horizontal.

1837. Or 35°?—Yes, in some places.

1838. What is the cleavage?—About 40 or 45 degrees from the horizontal.

1839. And what are your joints?—I do not know. Do you mean the diagonal joints?

1840. Take the "bevels," the angle of the "bevels"?—We have two kinds. There are some that bear a slightly longer angle than the line of pillaring.

1841. But what is the "slant"?—There are some steeper than others, about 20 and 25, and 30 degrees from the horizontal, say. The "bevels" vary very considerably.

1842. Would you call a "slant" of 20 degrees a "bevel"?—We would call that a "bevel slant."

1843. What about the "bevels"?—They are 30° or 35°—we have some very steep.

1844. You have some a good deal steeper than that?—Yes, we have one about 40 or 45 degrees.

1845. Would you be surprised to see it 70°?—I would.

1846. What about the "slant" again?—I think the "bevel" I referred to might be 70°, when I come to think of it. As to the "slants," they lie a little bit flatter than the cleavage.

1847. And sometimes steeper?—Yes, they vary.

1848. What would be your average angle?—From 42 to 47 or 48 degrees, I should think.

1849. Up to 50°?—Yes, up to 50°, probably.

1850. Your reposing angle is about 25°?—Yes.

1851. So vibration really is a movement that will start every particle in your quarry lying at a steeper angle than 25°?—Yes, it would tend to that naturally. I do not say that it would do so actually.

1852. Unless there is something behind it to press it down?—Yes.

1853. So pressure really is what keeps it together?—Yes.

1854. Will the beam roof avail very much do you think?—That depends upon the character of the rock. If it is a fairly large rock a beam roof, I should think, would answer our purpose, but if the rock is small we would have to arch.

1855. The rock will arch itself into an arch roof?—Yes.

1856. Will you keep in your mind, when you prepare the plan, how you intend to depend upon your arch roof when you go a little lower down. On the one side you have the extent of your own ground, and on the other you have Cwmorthin. Suppose you go deep enough into the ground so that the pressure will crush all your pillars, how do you intend to depend upon the arch roof hereafter?—That is a question I have not considered, because it is somewhat far in the future, I should think.

1857. You have already said that the "scribing" is increasing at a rather risky rate as you go down?—Yes, it is inseparable from the mode of working.

1858. And eventually you will have to consider it, not only for the sake of your men, but for another purpose?—(*No answer.*)

1859. It is a thing you will have to consider in the immediate future?—Yes.

1860. How do you intend to treat it?—I can tell you how it might be done, but whether or not we will do it in that way is another matter. A barrier might be left, say from the east end of the quarry towards the west, so that you might cut it up practically into two quarries.

1861. That barrier would help you as to the present system of a beam roof?—Yes, I think so. I am only pointing out how it could or might be done, but whether it will be done in that way is another matter.

1862. You are bound to see that the pillars are not being cut into. Supposing one of your men, by an accident or otherwise, went a little to the west side of your pillar, do you think that would injure the pillar very much as a rule?—It would tend to do that.

1863. But would it do so as a matter of fact. Suppose he takes 10 tons in that way from the west side of a pillar by under-cutting, and on the east side of the pillar that one ton might "scribe" out, which of the two would be the most injurious?—I should think the pressure bears or weighs greater on the east side of the "wall."

1864. Therefore you think that the ton would be most injurious to the pillar?—I cannot say anything with regard to the proportion, but I should think that the pressure would be greater on account of the configuration of the mountain on the east side than on the west.

1865. Or, in other words, the one ton would be taken away where it was most wanted?—Yes, but I cannot say what the amount of the relative mischief would be, whether the removal of one ton from that side would be equivalent to the removal of 10 tons on the other side.

1866. (*Mr. Evans.*) You have referred to what you consider are the means that should be taken to protect the men from things falling from above. I find from Dr. Foster's returns that a great many accidents happen from the slipping of the rock in the working places. Can you suggest anything to prevent this taking place?—It is a matter of impossibility, in my opinion. The men themselves, in order to check these accidents, will have to exercise more care and judgment. I am afraid that it is owing to their fault.

1867. You consider that they do not exercise as much care and judgment as they could do and as they should do?—Yes, that is certainly my opinion.

1868. Do you consider that the light of a candle is sufficient to enable the men to see properly the state of the working places?—Better light would no doubt be more advantageous if we could get it.

1869. Could you not suggest any better light?—No, I cannot suggest anything that you can get at a reasonable price. Of course you can if you like to be very extravagant.

1870. But you cannot suggest anything practicable?—No, I cannot.

1871. I think we heard yesterday that some of the water that found its way to the quarry was sometimes not very good, and you have referred to-day to water oozing from the rock?—Yes.

1872. Do you know anything of the quality of the water that runs from above, and whether it is pure or not?—I should take it to be good water, because the catchment is very much on a par with that of Llyn Morwynion, the lake that supplies the town with water. With regard to the quarry water, I may say that it is more or less piped all the way from the reservoir.

1873. I think it was said that you gave instructions to the men to boil certain water before using it, was that so?—Yes, I did, and with regard to the very water I am now speaking of. It was done for this reason. The drought last summer was so great that we had to run the reservoir nearly dry, and, by way of precaution, as I knew the condition of the reservoir, I told the men to boil the water before drinking it. I gave them that advice by way of precaution.

1874. So that was in consequence of the drought of last summer?—Yes, that was it.

1875. You have stated that you make a periodical examination of all the workings?—Yes, we do.

1876. Do you find that that is diminishing the number of accidents in your quarry?—Yes, I believe so.

1877. And would you recommend that the same plan be carried out at all the quarries?—That which I consider a proper thing to do at the Oakeley quarries I certainly consider a proper thing to do at all the quarries.

1878. Do you think there should be a special rule that this should be carried out at every quarry?—No. We are human beings, and I hope would be prepared to do everything that is possible for the safety of the men.

1879. But you are under special rules at present?—Yes.

1880. Do you see any reason why this should not be added to those special rules?—I see no objection, if you want to commit it to black and white.

1881. But you do carry out that work at your quarry at present?—Yes, we do, and we do it because we consider it a good thing to do.

1882. (*Mr. Jones.*) Would you not recommend that the same special rules be carried out in all the quarries throughout the county?—Yes, I would. It would be much more convenient to have uniform rules at all the quarries. For instance, when we have men coming to our quarries from other quarries, they are a little bit lost for a time owing to the rules being different; and I daresay, when our men go to the other quarries, they put the agents of those quarries to more or less inconvenience. At all events, I can easily suppose that to be the case. That is my experience.

1883. And you are satisfied as to the present special rules, and you do not want anything better?—I consider them uncommonly good. Moreover, the workmen, too, are taking to them.

1884. And you cannot, therefore, give any suggestions for their improvement?—No, I cannot, except the one or two matters I have referred to.

1885. (*Mr. Jenkins.*) I suppose you are very anxious to protect the lives and limbs of your workmen?—Yes, I am.

1886. And to that end, I believe, you have introduced many things into the quarry that the rules at present in force do not call for?—Perhaps I have.

1887. Therefore, you would recommend these improvements to other quarries where they are not at present carried out?—Yes, I would.

1888. We had some suggestions here yesterday, and at our previous sittings that there should be a minute inspection of every thickness in every chamber before it is allowed to get out of reach. I believe there is a

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rule that applies more or less to that matter. Would you approve of an inspection of that kind; I mean that it should be done minutely?—I consider that our present special rules provide for that, and if I see anything calling for it, I will put it in force.

1889. Would you approve of appointing a special official to do that work?—I do not see that it is wanted at all. If we, as managers, do our duty, and the workmen on their part do theirs, there will be no necessity for it. If the management and the workmen do their duty I think that we are amply provided for in the special rules as they stand at present. That is my opinion. Rule 85, to my mind, meets the case. That rule reads as follows: "He shall not put anything in "the way of the air-current, or disarrange any appli- "ance for directing the ventilation of the mine, or any "part of the mine. If the air be slack, so that candles "will not burn freely when placed upright, or if he "perceive any unusual quantity of water, or any in- "security of roof or sides, or of other parts of the "workings, or any breach of the Acts, or of these "rules, or anything that may appear unsafe, or likely "to produce danger, he shall forthwith report it to "the manager, assistant manager, or foreman in "charge, who shall not allow work to be resumed, "save in cases of emergency, until proper ventilation "has been restored, or the place made secure." There is also provision made in another rule, No. 82, as follows: "He shall, before commencing work, and "during the course of it, especially after blasting, "make a careful examination of his working place, "and remove any loose rock, stones, or ground that "might be dangerous." I contend that the last rule bears directly upon the question.

1890. Yes, it does, but there it is a duty resting upon the quarryman?—Yes, plus the management.

1891. As it is in that rule it is the workman's duty. Supposing that the rockman does not do it, what would you do?—I would summon him.

1892. Would you put it as it is in rule 48, that it is the duty of the manager to look after the workman, and to see that he does it?—Certainly.

1893. It might become in time a very dangerous thing?—Yes.

1894. And perhaps a great source of expense to the owners?—Yes, certainly.

1895. Would you, in order to prevent that, recommend that an inspection should be made by a certain official, if it cannot be done by the present officials, and also that it should be done minutely?—If the management of the Oakeley quarries is under-staffed we will put more men on, and it will be part and parcel of the duty of every one of us, from top to bottom, to see that the work you have referred to is done, and done properly.

1896. But you would not appoint a special man for that particular purpose?—No, I would not.

1897. You say that the men are more willing to observe these rules now than they were formerly?—Yes, they are.

1898. Were they at any time unwilling to obey these rules?—Yes. In the first instance they considered them very much too strict, and they considered that the management carried them out much too strictly.

1899. But the men are now more used to them?—Yes, they are, and we have very little difficulty now in carrying them out strictly.

1900. With regard to rule 61, which provides that every workman, or party of workmen, possessing explosives, shall keep them in a secure chest, how do you understand these words?—A chest that will satisfy Her Majesty's Inspector of Mines.

1901. But suppose a workman takes out of his chest a quantity of explosives for the purpose of charging a hole, and then leaves it in some corner until he wants it again, which may be within a very short time, would you require that man to take the explosive back to the chest and lock it?—I think I would.

1902. Does this rule demand that, do you think?—I have already stated that I take it that all these rules are governed by the expression "so far as is reasonably "practicable."

1903. Do you believe that that portion of the rule is "reasonably practicable"?—It would depend upon this, whether the man would leave the explosive on one side for 5 or 15 minutes, or for a whole day. The management will have to exercise its discretion. The agent would ask the workman, "What is this doing here?" and the reply might be, "I only put it there "for a few minutes." In a case of that kind, nothing more would be said of the matter.

1904. You think that is a matter for the discretion of the management?—Yes, that is my view of the matter.

1905. So that is not always a breach of the rule to leave the bugle of powder without taking it to the chest?—I should say not. It all depends upon circumstances. That is how I look at the matter.

1906. As to rule 60, do you think that the subsections, relating to the packages of gunpowder, are worded so as to be sufficiently intelligible to the majority of the workmen?—Perhaps not, if they forget the fact that the Slate Mines (Gunpowder) Act was passed to enable us to take a 25lb. keg into the pit.

1907. Do you think that the wording of that rule can be put in a form which would be more intelligible to the men?—That is a matter of composition, and I will leave it to abler men than myself. I should not like to express an opinion on a matter of that kind.

1908. With regard to certificated quarry managers, would you establish a rule, as is done at present in the coal mines, that every manager and assistant manager should hold a certificate?—Yes, I would.

1909. And do you think that would tend to diminish the risks to life and limb?—I believe so.

1910. And you consider the rule ought to be applied to slate quarries?—Yes, I think so.

1911. Have you any standard width for every wall?—We have a plan made beforehand, and it is on the plan what the width of each wall and chamber is to be.

1912. Are they to be put to a certain standard throughout the quarry?—No, they vary.

1913. Is there anything requiring that to be done, except the judgment of the management themselves?—No, there is only the judgment of the management, governed by the position of the chamber above.

1914. Then there is nothing else?—No, there is not.

1915. If you wished you could cut a pillar down to its half, could you?—Do you mean to suggest——

1916. No, I do not suggest anything?—The question does seem to me to suggest nonsense.

1917. But I do not suggest anything?—If you suggest that I would cut a pillar 30 feet wide and reduce it to 15 feet I consider that nonsense.

1918. (*Chairman.*) Mr. Jenkins did not mention a 30 feet wall, but supposing there was a wall of 100 feet?—Our walls vary in width from 30 to 60 feet. Therefore his question involved the 30 feet as well as the 60 feet wall.

1919. (*Mr. Jenkins.*) Is there anything that requires a specific width for a wall, a certain limit that the management would not be allowed to cut it under that?—Were I to do it I would soon be called to account for it.

1920. I do not suggest that you would do it, nor that anyone else would, but is there anything anywhere to prevent it?—As a matter of fact we do not do that sort of thing.

1921. But is there anything in black and white to prevent its being done?—It is a matter of discretion left to the management.

1922. (*Mr. Jones.*) Supposing a man is a landowner, and the property is freehold, as opposed to leasehold. In the case of leaseholds very likely the lease would prevent him, but take a freeholder who works his own mine without any check or restriction in the working of it?—I have not seen the lease of the Oakeley quarries and so cannot say anything at all about it.

1923. But I am talking of a freeholder not of a leaseholder?—I should think he could do as he liked.

1924. They can work their mines at their own will?—Yes, I should think so.

1925. (*Mr. Jenkins.*) Do you think that is right?—I should say that the management of the quarries should be left to the discretion of a competent quarry manager.

1926. (*Mr. Jones.*) As a matter of fact, how many of you as officials take part in work of that kind. Two or three, or perhaps more of you, go round every day, with or without the power to order the workmen to do

a certain thing or to examine and so on, how many of you are there that can give orders to the men in that way?—There are two at the Upper, two at the Middle, and three at the Lower, plus myself.

1927. You have yourself, your sub-manager, and very likely a timekeeper?—Yes, but I have done away with the foolish term, "timekeeper." We are all concerned in the management, and we have no such a man as a timekeeper.

1928. Three of you have the management or the looking after the *tori cefn*, as we say?—Not three. There are two at the Upper, two at the Middle, and three at the Lower, plus myself.

1929. So there are three looking after that work, the two men and yourself?—There are eight of us.

1930. (*Mr. Jenkins.*) As regards the certified quarry manager, would you include in the qualifications of such a manager of practical experience—that is, practical working experience?—Yes, I would; and I have already done so in the statement I made at the commencement. I should like to say a word with regard to an answer given here yesterday by Owen Rowland Jones. I think the answer, and the way in which he put it, cast a slur upon us all as quarry managers. It was with regard to inquests. As to the general charge brought forward by O. R. Jones as to not sending the right persons to give evidence at inquests, speaking for myself I may say that in no instance have I sent a witness to attend an inquest except as the request of a police-officer sent to me, for all I know, at the request of the coroner. The management have absolutely nothing whatever to do with the selection of witnesses to attend inquests.

1931. (*Mr. Jones.*) Do you receive the names of certain witnesses, or how is it done?—I receive the names of the witnesses from the police officer. He asks me to send so-and-so down to the inquest.

1932. (*Mr. Jenkins.*) Therefore the selection of witnesses always lies with the police officer?—I do not know who it lies with,—whether it is with the police-officer or with the coroner; but it does not lie with the quarry management. I am certain of that.

1933. (*Mr. Greaves.*) There was a suggestion yesterday that the Government should appoint a sub-inspector possessed of practical knowledge. I shall be glad to know whether such an inspector would conduce, in your opinion, to the safety of the men, and whether such an appointment would make them more careful or otherwise?—In my opinion, and speaking for the Oakeley quarries, it would not.

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1934. As to a suggestion which was made as to fixing permanent appliances in the openings for the purpose of examining the roofs,—what would be the effect, in your opinion, of corrosion by long exposure to the atmosphere upon these appliances?—In course of time corrosion would deteriorate them very much.

1935. It would render them useless?—Yes.

1936. (*Mr. Jones.*) But I suggested things that would not corrode?—The greatest danger to appliances of that description would be their becoming unreliable through being hit by stones in blasting. I should not like to trust to them myself.

1937. (*Mr. Evans.*) It may interest the public to know—do you think that any of the workmen, in ordinary circumstances, are unable to feed and clothe themselves properly in this neighbourhood, in consequence of the wages they receive being too low. I do not suggest that they are low?—I do not know that that question has anything to do with the inquiry; if it has, I will answer it.

1938. (*Chairman.*) It might be put in this way—whether any defects as regards clothing or diet are likely to be traced in this district, not at any particular quarry, to the men not being paid enough?—I do not think so.

1939. (*Mr. Jones.*) I think a hint was thrown out yesterday that some of the men were not properly clothed owing to the habit of spending money on drink. Can you speak of your men as a class in regard to drink?—Amongst 1,600, you are sure to find some black sheep; but as a class I consider them a very sober class of workmen.

1940. Do you think there are many individuals in your quarry who cannot afford the proper clothing to come to their work in on account of drink?—No, not on account of drink; if there is any fault at all, it is want of thrift at home.

1941. But I am referring to drink?—No, except in very rare cases, that is not the rule.

1942. But you think there are exceptions—men who do not provide themselves with proper clothing; but who spend their money on drink?—I cannot think of any just now.

1943. Seeing that you have 149 working chambers, and that you have not had a single accident owing to falls from roof, either fatal or non-fatal, I think you are to be highly complimented. It is a very wonderful record, and deserves special mention?—We have not had a single one during the last three years.

Mr. David Griffith Williams examined.

Mr. D. G. Williams.

1944. (*Chairman.*) What is your occupation?—A slate-maker and rockman. I have had experience in both.

1945. How long have you worked altogether in the quarries?—For over 40 years.

1946. How long have you worked above-ground?—I am not certain. I have been working inside for a long time. I have been in and out at different times.

1947. What suggestions can you make to us for diminishing the dangers that quarrymen are liable to?—First of all I would like to refer to dangers overhead. I would suggest that no working be commenced in any chamber unless it has been previously inspected and found perfectly safe to work in. Also, that no chamber which has been pronounced dangerous, and which has been stopped, should be worked again until it has first of all been inspected and found to be quite safe. I also consider that the floors should not be worked too near each other, that is to say, the platforms should not be worked too narrow.

1948. What next?—I will state my reasons, first of all, for what I have just suggested. I know of a place where a man worked, and there was dangerous rock above. The man went on with his bargain in the hopes that he could finish it without removing the dangerous rock, but it fell upon him. In another case where they had stopped working for a time, and afterwards recommenced, a portion of the rock came down after they had recommenced to work. The place had not been worked for some time, and after leaving it in that way for a certain period, they thought it was safe to work in, as nothing had come down. A level was driven in front of what came down, and after working there for some time a quantity of stuff fell during the night exactly where the men had been working. Scores of tons of stuff fell down. With regard to floors which have been driven too close to each other, I know of one case where there was only the width of a tram between. In the other floor there was a tram or a road, along which they used to come and go, and a truck load of material came down from the floor above. No accident happened at the time, but there would probably have been a fatal accident if anyone had been standing there at the time. I should also like to refer to the roof of the sheds in which the men work. I know of a place of that kind in which the woodwork which supported the roof was rotten. It came on to snow one night and the timber and slates all came down on top of the sawing machines. The sheds also ought to be properly ventilated. I know of sheds where there has been no provision whatever made for ventilating them. In the sheds there should also be a safe place to put the belts, that is, planks should be fixed there. I know of accidents that have happened when a man was engaged in putting the belt on the pulley. As there was no room for him to stand properly he went between the strap and the pulley. A convenient place should also be provided in which the men can dry their wet clothes, and attention should also be paid to the water provided for the men.

1949. (*Chairman.*) Do you mean water for drinking purposes?—Yes, and for preparing their food at dinner time. Another matter I should like to refer to is the trams, which are too near to the outside of the mill. I know of a case in which one of the men lost a limb, owing to a stone falling from the waggon and breaking his leg.

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1950. You say you know of cases in which the floors have been too narrow?—Yes.

1951. What do you think ought to be the smallest width for the floor of a gallery?—It ought to be at least two or three yards wide.

1952. Do you mean two or three yards wide altogether, or two or three yards beyond the outer rail of the tramway?—Two or three yards from the tram, so that there would be plenty of room for stuff to fall.

1953. With regard to the safety of the sheds, do you know of any sheds which have a rotten roof at the present time?—I cannot say I do at present. There may be some if I were to go round to search for them.

1954. You referred to a case where the roof of a shed fell in?—Yes.

1955. Did that take place a long time ago?—No, only a little more than a year ago.

1956. With regard to the ventilation of the sheds, you say you know of cases where no provision for ventilation was made?—Yes, I know of cases where there is no ventilation at the top of the sheds.

1957. Are there doors which open?—Yes, the doors open.

1958. And are the doors kept open?—Yes, they are.

1959. Do the men in those mills suffer in any way from want of ventilation?—If the doors are left open there is very often too much air or wind, and there is no provision for ventilation except by means of doors.

1960. Then what kind of ventilation would you propose; what do you wish for?—I would suggest something similar to what they they have at the present time at the Penybont Mill at the Oakeley quarries.

1961. What is the plan that they have adopted there?—There is ventilation at the top of the roof.

1962. Are there openings in the roof?—No, not in the roof, but they have fixed proper ventilators.

1963. Through which air can escape?—Yes, and another advantage is that dust can pass out better.

1964. (*Mr. Greaves.*) How long have you worked above-ground?—I have worked outside for about 25 or 30 years.

1965. And how long underground?—Perhaps for about five or seven years. I worked one bargain all along in the bottom of the Oakeley quarries.

1966. So your experience has been principally in the mills?—Yes, I have been outside mostly, but I have had experience in as well as out.

1967. (*Mr. Jones.*) We had it given to us the other day that men should go to the quarry at an early age, and that if they intended to work as rockmen they should first of all have a few years' experience in the mills. What is your opinion as to that?—It would be a great convenience to masters and workmen.

1968. Will you give us your reasons for that opinion?—A man who has had experience in the working of slates as a slate-maker knows the nature of the rock better, and consequently knows how to pull the rock better.

1969. What do you include in the term "pulling the rock"?—It includes cutting the rock loose as blocks and making them suitable to send out.

1970. What do you mean by "making them suitable "to send out"?—To trim them properly, so that there is no waste in splitting them.

1971. Why would the experience of a young man who had worked outside be useful—how would that bear on the trimming of the slate?—A man who has been working outside knows what the size of a slate is to be, and consequently what the width of the block is to be for making the slates.

1972. With regard to the question of the ventilation of the mills, we had it the other day that there was rather too much air or wind coming into the mills when the doors are left open. What is your experience on that point?—I consider that too much air comes there when the doors are left open, and when they are closed there is no ventilation at all.

1973. Do you know of any roof ventilators—the old-fashioned ventilators—that have been put in anywhere?—No, I do not know of any at the present moment.

1974. What is the nature of the ventilator that you have referred to as being in use now at the Penybont Mill at the Oakeley quarries?—Mr. Roberts, the manager, can tell you better than I can. I would rather not attempt to explain it, lest I should make a mistake.

1975. (*Mr. Evans.*) You consider it an important matter that the men who go to work the rock should have experience as to the size into which the rock should be cut up?—Yes, that is very important, in my opinion.

1976. You believe that some time is required to enable him to understand that branch of his calling?—Yes, I do.

1977. Do you consider that a man in working the slates comes to understand the nature and proclivities of the slate?—Yes.

1978. And then he knows how to treat it in the rock?—Yes, he does.

1979. Do you consider that to put a man to work on the rock without having some experience of slate and of treating it is a mistake?—Yes, I consider that that is a very great mistake.

1980. What time do you think that a man should have to enable him to understand the rock?—He ought to work outside in the mills for three or four years, at any rate.

1981. And the man who is taken from the waggons, how long should he work on the rock before he is allowed to take charge?—I consider that many of them ought to work there for a lifetime.

1982. You think a man should begin early in order to understand the work of a quarryman and rockman?—Yes, that is my opinion.

1983. You have given it as your opinion that great care should be taken before leaving the roof or the side of the pillar. Can you give us any idea what the quarryman should do in order to prevent slips, which I understand is a frequent source of accidents at the Festiniog quarries?—I think there ought to be a man appointed specially to do that work.

1984. Are the non-fatal accidents as numerous as the fatal accidents in the Festiniog quarries?—Yes, I believe they are.

1985. And are there many narrow escapes from accidents in consequence of things falling?—Yes.

1986. Do you think that the Committee should consider those as well as the fatal and non-fatal accidents?—Yes, I do. They ought to do that in order to try to avoid them.

1987. And you think that is a very numerous class?—Yes, a great many of those occur.

1988. What can you suggest in order to protect the men when they put the straps on the pulleys?—There should be plenty of room for them to stand on.

1989. We have heard something about inquests. Do you think that inquests are carried on in a proper manner at present, or can you suggest anything that would satisfy the men better than the present mode?—In my opinion, they are not carried on as they should be. I believe there should be some provision as to securing the men who come forward to give evidence.

1990. What do you mean by "securing" them? Have you anything to suggest?—I consider that the chief witnesses should have fair play to come forward to give evidence without anyone interfering with their evidence before they come forward.

1991. I suppose you base that remark on the supposition that someone does interfere with the witnesses beforehand?—Yes, I do.

1992. Would you have any objection to refer to any cases of that kind, or would you rather not do so?—I have no objection to refer to a man, provided I am quite sure that that person will not have to suffer on account of that hereafter. I do not know whether the Committee can give me any assurance on that point.

1993. I am not in a position to press you to give the name, as I am a stranger to the neighbourhood. You would rather not name him?—I would rather not name him unless I receive permission to do so, or some assurance that he will not suffer in consequence.

1994. Is it within your knowledge that persons have suffered in consequence of coming forward to give evidence at inquests?—Yes it is. I can give an instance of that now without naming the person.

1995. I am afraid that if you wish to give an instance you will have to give all particulars, including the name; are you prepared to do that?—(*No answer.*)

1996. (*Mr. Jones.*) Can you give us the plain facts of the case without making any insinuations, or giving any names?—(*No answer.*)

1997. (*Mr. Evans.*) We do not want to press you, but I do not think that the Committee can act on the evidence, as far as it has gone at present, unless you can prove something. You must go right through it, or it falls to the ground. You can either refer to a case or not, just as you wish?—I will refer to one case, as it may be of advantage to the Committee to know of it.

1998. (*Chairman.*) Then you are prepared to go through the whole thing, and to give names?—No, I cannot do that.

1999. (*Mr. Evans.*) Can you give us an account of the general manner in which inquests are conducted in this neighbourhood with regard to which you wish to make a statement? Tell us of anything which you consider is wrong in the way in which they are carried out here?—As a rule the principal witnesses are spoken to by the authorities, and they are told what to say when the inquest comes on.

2000. What do you mean by the "authorities"?—The agents of the quarries—some of them. One of the men told me that giving evidence at an inquest was the most unpleasant business he had ever been engaged in. He was the chief witness at an inquest in the case of a man who had been killed at one of the quarries, and the unpleasant part of the business was that he had to say what he had been taught to say, and not the simple facts.

2001. (*Mr. Greaves.*) A man told you that?—Yes.

2002. That is not your own experience?—I was told that by the man.

2003. (*Mr. Evans.*) What else have you to say?—Men who are acquainted with the occupation of the deceased should be called on the jury.

2004. And what else?—I would suggest that the societies should have the right to send a person to the inquest to represent the interests of the men.

2005. What do you mean by "societies"?—That the Quarrymen's Union should send a man to represent their members.

2006. (*Mr. Jones.*) As is the rule in the case of a coal mine?—Yes, it really comes to the same thing.

2007. (*Mr. Evans.*) You mean that the governing body of the Quarrymen's Union, or the majority of the Union, should send a man?—Yes, that the majority should nominate a man to represent the interests of the members of the Quarrymen's Union.

2008. (*Mr. Greaves.*) Why the men of the Union, and not the quarrymen generally?—Because they have formed themselves into a society, and the others who are outside have not.

2009. (*Mr. Evans.*) But you would have no objection for the other section of the quarrymen, who are outside the Quarrymen's Union, to send a representative, I suppose?—No, not in the slightest degree.

2010. So that all the quarrymen would be represented at the inquest, whether they are members of the Union or not?—Yes.

2011. You said in the course of your evidence that you knew of floors which are worked too near to each other?—Yes, I do.

2012. Is that state of things in existence at the present time?—I believe it is, but I cannot be sure. I have not been there for some time.

2013. Are there proper roads for the men to go and come to and from their work in the quarry, as a general rule?—No, there are not.

2014. Is that a general thing?—No, it is not very general. There are some very good roads for the men to go along, but there are exceptions the other way.

2015. Are the good roads the exception or the rule?—They are the exception.

2016. Which are the exception—the good roads or the poor ones?—The very good roads are the exception.

2017. Are the roads generally good, or sufficiently good for the men to pass along?—No, they are not.

2018. I am referring now to the underground roads?—Yes, that is what I am referring to. I have a case in my mind now in which it is dangerous for the men to walk along.

2019. Do you wish to name that place, or would you rather not?—I have no objection to name it, in order that it may be improved, unless that has been done already.

2020. I think you should choose for yourself whether you will name it or not?—There is a place in the Llechwedd Quarry where water falls on the path, and when there is snow about and frost it is dangerous for the men to walk along that way.

2021. You could point out the place, if you were asked to do so, I suppose?—Yes, I can, and when it comes on to freeze anyone can go there to see it for himself, unless the place has been altered recently.

2022. (*Chairman.*) Is this path that you are referring to above-ground or underground?—It is underground.

2023. How far underground?—It is not very far.

2024. (*Mr. Evans.*) Is it dark there or light?—It is dark in one place and light in another part.

2025. We have heard from a doctor that it is a great labour for the men to walk long distances to their work; are the roads or paths in the district in a proper condition for the men to walk along?—There are some bad paths along which they have to go.

2026. Are they in such a state that the attention of the authorities should be called to them?—I believe that some of them are.

2027. (*Mr. Jenkins.*) You said just now that you knew a chamber, or that you had heard of one, which was pronounced as dangerous, and then re-commenced before any inspection was made of it?—Yes, that is so.

2028. Has that occurred of late years?—No, it has not occurred very lately.

2029. Have you reason to believe that anything of the kind has occurred in recent times?—I mentioned it for fear it might happen again.

2030. Was that the rule, or was it the exception?—It is very likely an exception, because it is an unusual thing for chambers to be in that way. It is not the ordinary rule.

2031. Is there any system of inspecting in the quarry you know most about?—I do not know of any. Perhaps there is. I have been working there for a long time, and I have not seen anyone examining, except what the workmen themselves did in that way. Some time back I was working at night, and a piece of the "hard" came down overhead. I did not hear from the men who were working there that anyone had been inspecting the place.

2032. Do you know that there is any known dangerous place there?—I cannot say.

2033. As to the ventilation of the sheds. Do you complain that they are not ventilated in a proper way, or do you say that there is no ventilation at all?—There is no proper ventilation there, in my opinion. The only ventilation they have is through the doors and in no other way. If the doors are closed, there is no ventilation at all, and the place is too close.

2034. Is there enough wind?—When the door is open there is too much.

2035. What would you call that, draught or ventilation?—Draught.

2036. With regard to the laying of dust, it was suggested here yesterday that a door should be made at the back, behind the dressing machine; would you recommend that?—Yes, I would. I think it would be very desirable, because the wind blows the dust up to a man's face when he is working at the dressing machine.

2037. And you think that door would be an improvement?—Yes, I have no doubt it would.

2038. What would you say as to running a pipe, as has been suggested by one witness, along the shed in order to lay the dust down by a spray of water?—I consider it would be a very proper thing in the summer months when the mills are dry, but in some cases the mills are damp. They are not dry underneath, and there is always plenty of water in those cases.

2039. Do you know of cases where the mills are wet underneath?—I have been working in one in which my boots were nearly covered with water.

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2040. And all those ought to be dried?—Yes, certainly they ought.

2041. What do you think of the present system of inspection; do you think that this dual inspection is advantageous?—I do not think it is effectual enough.

2042. You know that the sheds are under two inspectors, the Inspector of Mines and the Inspector of Factories; do you believe that that is advantageous?—I believe it would be desirable to have them under one inspector.

2043. And that, I suppose, the Inspector of Mines?—Yes, I believe so.

2044. What is the opinion of the men as to the way in which Dr. Foster does his work, do they approve of it?—They approve of it as far as it goes. They consider it would be of advantage if he were more practical and understood Welsh.

2045. But as far as the work he does is concerned, he is the right man to do it?—Yes.

2046. Do they believe that a man in the position of the present inspector should possess scientific knowledge?—Yes, of course.

2047. And that he should be assisted by another man having practical working experience?—Yes.

2048. (*Chairman.*) You have said that in some cases there is not sufficient room for a man to stand when he is putting up a belt?—Yes.

2049. Cannot a man have the machinery stopped whilst he is putting the strap?—Yes, he can do that, but in some cases the machinery must be set in motion before he can put the belting up, and then there is no room for him to stand to do it.

2050. With regard to coroners' juries, would you be satisfied if the coroner gave instructions that in cases of quarry accidents the police should summon six practical workmen from that class to sit on the jury, that is to say, one half of the jury?—Yes, I would, and I would suggest that there should be some kind of board behind the men to protect them when they come forward to give evidence.

2051. (*Mr. Jenkins.*) And you would be satisfied with even less than half the jury composed of quarrymen?—No, I think they ought to be half and half. That seems to me a very fair arrangement.

Dr. R. Jones.

Dr. RICHARD JONES, Blaenau Festiniog, recalled and examined by the Chairman.

2052. I believe that since you gave evidence before the committee you have a further statement that you would like to make?—Yes, that is so.

2053. Will you kindly make it?—First of all I was unable to give the number of the question before the Labour Commission with regard to the mean age at death of the quarrymen. The number of the question, I find, is 7160. I was also asked a question by Mr. Jenkins as to whether females over 14 years of age were more subject to consumption than males in this district, and offhand, without having any figures to guide me, I stated that I thought the females were more subject to that disease than males. Since then I have gone carefully into the matter. I went to Portmadoc, and I examined the registers of deaths for 10 years, and I find that during that 10 years there were 720 deaths amongst females over 14 years of age, the mean age at death being 51·48 years. The number that died from phthisis, out of that 720, was 154, the mean age at death of those dying of phthisis being 31·47. The proportion of deaths of females from phthisis, out of 1,000 deaths from all causes, was 213·8. That will appear from a table which I have put in.* Now, we found that the quarrymen die at the rate of 154 per 1,000 from phthisis, taking the number of deaths over 14 years of age, as in the case of females. The number of deaths from phthisis among those not employed in the quarries is 173 per 1,000. The rate is higher, therefore, among females than it is among quarrymen or non-quarrymen. I should like to say that these figures may not be anything out of the ordinary condition of things throughout England and Wales. Taking the number of deaths from consumption throughout England and Wales, we find that more females die of that disease between the age of 5 and 35 years than men, but up to the age of five years and over the age of 35 years more males die. That is a fact, therefore, that ought to be taken into consideration when you want to compare the number of deaths from consumption amongst males and females respectively. The mean age at death of females who die from consumption is 31·4 years, quarrymen 39·06, and non-quarrymen 35·6. As I have already said, I answered the question put to me quite offhand, and I was not able then to give you the figures bearing upon the question.

2054. (*Mr. Evans.*) You take the same age in both sexes?—Yes, all over 14 years of age. I was also asked on the former occasion to give a mortality figure for the Festiniog quarrymen. This I did, and I put the number of men between the ages of 25 and 65 employed at the quarries as 2,000. Since then, after having seen Dr. Foster's table giving the exact number of men employed, I have been able to arrive at the figure, I have not taken the 2,000 as a guess, but have obtained the actual figure. I work it out thus:—The number of deaths from all causes above 14 years of age amongst the quarrymen was 473. The number of deaths amongst those between the ages of 25 and 65 was 275. Those deaths I took as relating to 3,000 men, because we agreed on the former occasion that 500 men lived outside the district for which these figures are prepared. I therefore took 3,500 as being the total number of quarrymen employed, but according to Dr. Foster's figures the number is 3,326. Deducting the 500 from that figure, it would be a little under 3,000; but Dr. Foster's figures do not include the men employed at the Graig Ddu quarry, whereas they are included in my figures.

2055. (*Mr. Jones.*) What are the 500?—They represent the estimated number of men who live outside the district to which these figures relate. They are the men who live in Garn, Criccieth, Bettws-y-coed, Harlech, Portmadoc, and so on.

2056. And you estimate those at 500?—Yes, that is as near as I can get it.

2057. (*Mr. Evans.*) Have you checked that 500 with anything?—No, I have not checked them, I thought it was the nearest approach to what is right that I could think of.

2058. (*Mr. Jones.*) It is an approximate figure?—Yes. Now, with regard to the number of men employed; if you take the ratio of the deaths, you get at the figure 1744, but the proportion of deaths is less in the ages under 25 years, but larger over 65, so that I make a further deduction from that, and in the end I arrive at a figure of 1675 as representing the men employed in the Festiniog slate quarries between the ages of 25 and 65. If you take that figure of 1675, you find that you get 27·5 deaths per annum, or 275 in 10 years. This comes to 16·44 per 1,000. The standard figure of Dr. Ogle is 64,641, so that if you get 16·44 deaths out of 1,000, how many would you get out of 64,641? You will find that that works out to 1,062, and not to 1,043, as I said in my former evidence. The difference between those two figures—the 1,062 and the 1,043—is accounted for by the fact that I have now the exact figures upon which to base the calculation, whereas at that time I had not got them. I only spoke then of deaths from consumption. Since, I have gone carefully into all the causes of death amongst the quarrymen, and I produce a table giving the figures (Table XIV.). In the 10 years between 1883 and 1892 there were 275 deaths, which I have classified in the table I now put in under the various headings which you will find there. From those figures I have prepared another table (Table XV.). After getting the number of deaths from all causes during the 10 years, I have worked out a table which I call a comparative mortality table, taking as a basis the figures supplied by Dr. Ogle in his book (the Supplement to the 45th Annual Report of the Registrar-General), I find that out of the 275 deaths from all causes, the number of deaths from consumption was 53. That works out, taking my standard mortality figure as 1,062, to 204. The figure for all males throughout England is 220, and the figure for stone and slate quarriers is 308.

2059. (*Mr. Greaves.*) Showing a distinct advantage to the men employed in these quarries?—Yes, in the deaths from consumption between the ages of 25 and 65.

* Table X.

2060. It shows a distinct advantage?—Yes. These figures show that the males throughout England and Wales die at a higher rate from consumption than the Festiniog quarrymen. Again, out of the 275 deaths from all causes, the number of deaths from other diseases of the respiratory organs was 68. If we work these out in the same way as the deaths from consumption, we get at the figure 298, whereas the figure throughout England and Wales is 182. The figure for stone and slate quarriers, according to Dr. Ogle, is 274, so we find that the Festiniog quarrymen, excluding consumption die more from diseases of the respiratory organs that the males throughout England and Wales, and also at a higher rate than the stone and slate quarriers put together. If we add the two sets of figures together, those relating to consumption and to other diseases of the respiratory organs, the figure for the Festiniog quarryman is 502, for the males throughout England and Wales the figure is 402; and for the stone and slate quarriers generally, 582.* Therefore, when you add the two together — consumption and other respiratory diseases — the figures show that the Festiniog quarryman, although he dies more from other respiratory diseases, he dies less from both classes of diseases than do the slate and stone quarriers, according to Dr. Ogle's figures. There is a difference, on the two together, of 80 in favour of the Festiniog quarryman. On the former occasion, I compared the deaths among quarrymen and non-quarrymen over the age of 14 years, but I have now compared them between the ages of 25 and 65.

2061. (*Mr. Jones.*) Who do you include in the term "non-quarrymen?"?—Every male that died (in the 10 years) outside those employed at the quarries.

2062. Within the district?—Yes, the same district. There were 275 deaths amongst the quarrymen, 121 being from diseases of the respiratory organs, giving us 440 per 1,000. Amongst the non-quarrymen, the total deaths were 152, out of which 69 died from respiratory diseases, or 453 per 1,000. If we take consumption by itself, we find that 192 per 1,000 of the quarrymen died from that disease, against 269 per 1,000 amongst the non-quarrymen. I have prepared a table of the diseases and age at death, in the case of quarrymen and non-quarrymen, as they appear in the registers of deaths. It works out exactly in the same proportion between the ages of 25 and 65 as it does over the age of 14 years, and as I had it on the first day. If we look at the number of fatal accidents, we find the number is 53, exactly the same number as those who died from consumption, and the figure works out, of course, to the same, viz., 204. The accidents, according to Dr. Ogle's figures as to slate and stone quarriers, work out to 148. The Festiniog quarryman, therefore, dies at a higher rate from accidents than the stone and slate quarriers throughout the country generally. The figures work out in this way. If you deduct the accidents out of the deaths amongst stone and slate quarriers, that is 148 from 1,122, you get 974; and in the same way, by deducting 204 out of 1,062, you get 858 as representing the Festiniog quarrymen. If, therefore, you deduct the number of fatal accidents from the number of deaths, the figures show a distinct advantage in favour of the Festiniog quarrymen as regards deaths from disease. If you make a comparison between accidents and diseases of the respiratory organs, you find that the figure of the Festiniog quarryman for diseases of the respiratory organs is 502, as against 402 for all males thoughout England and Wales, or a difference against the Festiniog quarryman of 100. The figure for the Festiniog quarryman as regards accidents is 204, and for males throughout England and Wales 67, showing a difference of 137, so the ratio is as 100 is to 137 against accidents. From these figures I conclude that it is more important to reduce death by accident than it is to reduce deaths from diseases of the respiratory organs.

We now come to pneumonia, and I may at once say that in my opinion this is the most common disease from which the quarryman suffers. Out of the 275 who died from all causes, 50 died from pneumonia, the figure working out to 193. That is only 11 less than those dying from consumption, and when we consider that 9 out of 10 of those who are attacked with pneumonia recover, it at once shows you the number of cases of pneumonia that occur in 10 years. You get in that way 500 cases of pneumonia in the 10 years. The cases of consumption that terminated fatally in the 10 years were 53, and I do not suppose that 1 out of 10 recover. These figures, therefore, at once show the prevalence of pneumonia in this district. The figures, I may say, include the deaths from all forms of pneumonia. We had in 1889 an epidemic of pneumonia, with 30 cases in one month, of which 13 died. It was an epidemic of infectious pneumonia, no doubt propagated by a germ such as was the case in other parts of the country. Dr. Klein examined the sputum of pneumonia patients, and found that it was so, and I have no doubt it was the same here. There is also a form of pneumonia which we put down to defective sanitary arrangements. I find that pneumonia is far more prevalent amongst those who work under-ground than amongst those who work above-ground. There are now three or four men, whom I know, suffering from pneumonia, and they are men who work underground. I attribute this to the even temperature the men work in. They get hot, and after coming into the open air they perhaps loiter about to wait the trains to take them home, and so on, and the exposure they are thus subject to, and in many cases wet clothes, and possibly the conditions under which they work, have a good deal to account for. I understand that in these quarries more gunpowder is used to take the rock away than is usual amongst miners in other mining districts, and it is a well-known fact that the products of combustion after an explosion of gunpowder are very much more injurious to health than in the case of blasting gelatine or other nitro-glycerine explosives. In the case of gunpowder you get carbonic acid, carbonic oxide, sulphurous acid, H_2S, C_2H_4, &c., whereas in the case of nitro-glycerine you only get carbonic acid and nitrogen. I do not know how far that may bear on the question, but it is well known that sulphurous acid is very easily converted into sulphuric acid, and I believe this to be a factor in the consideration of the question.

Coming now to diseases of the nervous system, I find that the number of deaths in the 10 years was 20, which works out to 77. The figure for all males throughout England and Wales is 119, and for stone and slate quarriers, according to Dr. Ogle's figures, 83, which shows that, as regards diseases of the nervous system, the Festiniog quarryman is better off than either of the two classes referred to.

Diseases of the alimentary system were the cause of 30 deaths in that period, which works out to 116, as against 77 for the males throughout England and Wales, and 63 for stone and slate quarriers in general. This at once shows that the Festiniog quarrymen die more from diseases of the digestive system than the males throughout the whole country of the same ages, and also more than the stone and slate quarrier, as given by Dr. Ogle. The cause of this increase is not, in my opinion, far to seek. Their diet, as stated in my former evidence, and also their mode of cooking it, have a good deal to do with the question; but whether that is sufficient to account for it I cannot say. The deaths from the same diseases amongst those not employed in the quarries is almost as high as that of the quarrymen, the figure being 111 in the case of the non-quarryman, against 116 in the case of the quarryman.

If we take diseases of the liver* by themselves, we find that the number of deaths was 10, which works out to 38. The figure for the males throughout England and Wales is 39, which is exactly the same as the Festiniog non-quarryman, and Dr. Ogle's figure for the slate and stone quarriers is 25. The Festiniog quarryman is therefore more subject to liver diseases than the stone and slate quarriers of the country generally. If we exclude diseases of the liver from diseases of the alimentary system, and work it out in the same way, we find that the figure for the Festiniog quarryman is 77, as against 38 for the males throughout England and Wales, and 38—exactly the same—for stone and slate quarriers generally. The Festiniog quarryman, therefore, if you exclude diseases of the liver, dies from diseases of the alimentary system at more than double the rate of stone and slate quarriers and of males generally. If we take cancer alone—I have not been able to get the figure for England and Wales—but the figure for Festiniog is 61, which I believe to be a high figure. Dr. Ogle does not give the figure for the country generally, and I have been unable to obtain it anywhere. I may say that, amongst the males, cancer is most common in the stomach, liver, and bowels.

* *Vide* Table XV.

* These include Diabetes.

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2063. (*Mr. Jones.*) You have not been able to get at the figure for comparison?—No, I have not. If we take diseases of the circulatory system—diseases connected with the blood and heart—we find that the number who died of those diseases—out of the 275 from all causes—was 18, which works out to 70. The figure for the males throughout England and Wales is 120, and Dr. Ogle's figure for stone and slate quarriers is 91, so that in respect of diseases of the circulatory system the Festiniog quarryman is better off than the stone and slate quarriers in general.

If we take rheumatism again, the number of deaths amongst the Festiniog quarrymen during the 10 years was nine, which works out to 34. I have not been able to find the comparative figure in this case either, but if you include the circulatory system, as given in Table XV., it works out in this way, all males throughout England and Wales, 120; stone and slate quarriers, 91; and Festiniog quarrymen, 104; so that the Festiniog quarryman is a little higher than the stone and slate quarriers, but lower than the males throughout England and Wales. We have a lot of rheumatism here, due no doubt to the meteorological conditions, the rainfall, the dampness of the soil, &c., which I need not now refer to.

As to diseases of the kidneys again, the figures for males throughout England and Wales is 41, and stone and slate quarriers, 24, whilst the figure for the Festiniog quarryman is only 15, so that they die less from diseases of the kidneys than the other classes. The figure for the Festiniog males generally is 65, but in this, you must remember, are included tradesmen and licensed victuallers, and kidney diseases are very common amongst the licensed victuallers, which makes the figure high. The figure, therefore, for all males in Festiniog, over 25 and under 65 years of age, is 65, and only 15 amongst quarrymen of the same age.

2064. (*Chairman.*) You say that the figure of 65—diseases of the urinary system—is high amongst the Festiniog males because it includes the licensed victuallers?—Yes.

2065. Do not licensed victuallers suffer a good deal from liver diseases?—Yes, they do.

2066. But according to these figures the non-quarrymen and the quarrymen have almost precisely the same death-rate from liver diseases?—Yes, the figure for the quarryman is 38 and the non-quarryman 39.

2067. So that there is no reason to suppose, from those figures, that the Festiniog non-quarrymen are given to alcoholic excess?—No.

2068. How do you account for the high figure of 65 from diseases of the kidneys amongst the non-quarrymen?—I cannot account for it.

2069. That appears to be the figure?—Yes; I have gone into it carefully.

2070. As to the figure of 298—other diseases of the respiratory organs—can that be accounted for in any way by dust?—As I said on the first day, I do not believe that dust can be said to be the cause of pneumonia, and pneumonia is the means of swelling up that figure. The primary effect of dust, as I said before, is mechanical. It irritates the lung, but how far it may render that lung more susceptible to disease I cannot possibly say. That is the view I take of the matter. It undoubtedly irritates, but how far it renders the lungs more susceptible to disease I cannot say.

2071. It would not cause the disease, you think?—No, not by itself.

2072. (*Mr. Jenkins.*) But you have no doubt it does to some extent?—I put it down as one of the conditions that produce the diseases or as one of the factors.

2073. (*Chairman.*) As far as the death-rate is concerned, it is more important to prevent accidents than to prevent disease?—Quite so.

2074. Which of the two—accident or disease—is most easily prevented?—I am no authority on that question. The figures work out in the ratio 100 to 137, so there is more work to do with accidents than with diseases of the respiratory organs.

2075. With regard to pneumonia, you have stated that there are epidemics of pneumonia and that the disease occurs mainly among the men who are employed under-ground?—Yes, I believe the larger proportion of those attacked are men who work under-ground.

2076. If the disease is caused by a germ of any kind, why should the bacillus go under-ground and affect men there more than above the surface?—I cannot say, except that the conditions under which they work, compared with the conditions outside, are conducive to a chill, which develops the disease.

2077. Without the bacillus?—It is the opinion of the best authorities that there is a pneumonia bacillus.

2078. Is it not an opinion of some that there is a bacillus living in the earth that brings on tetanus?—Yes.

2079. Is there any reason to suppose that there is a bacillus under-ground that produces pneumonia?—I do not know.

2080. (*Mr. Jones.*) What about dampness?—That would be one factor in the production of the disease, the same exactly as dust or smoke, or the combustion of gunpowder.

2081. Dampness and working in damp clothes would help to bring it about?—Yes.

2082. (*Mr. Greaves.*) And also variations in temperature?—Yes, that affects it also.

2083. (*Mr. Jones.*) And the difference in temperature is great in summer?—Yes, it is. With your permission I should like to quote from the meteorological readings I got from you some time ago, Table XVI.

2084. You are quite welcome?—By the kindness of Mr. E. P. Jones, I obtained from him in 1890 some meteorological readings which he keeps, showing the rainfall, the readings of the barometer and the thermometer, and the direction of the wind for a period of three years. I will hand them in in the form of a table.

2085. (*Chairman.*) What are the deductions that you make from the figures?—That the epidemic of pneumonia had a close connexion with the meteorological conditions existing at the same time. They all occurred in a month, and we never had a case after that.

2086. Do you mean that the germ was wafted by the wind?—Yes; it was infectious.

2087. And it was wafted here by a particular wind?—Yes, no doubt. The epidemic was in June 1889, and in that month there were 17 days of north, north-east, and easterly wind. The rainfall for the month was ·89 inches. The mean average of the barometer was 29·335, which was a higher barometric reading than that in the corresponding month in other years. The mean average temperature was 59·17 indoors, and 56·9 out of doors. The atmosphere was very dry, and the nights excessively cold.

2088. (*Mr. Greaves.*) In every country where the days are hot and the nights cold, you have great prevalence of pneumonia?—Yes, that is so. People are apt to neglect themselves, and take a chill, which develops into pneumonia.

2089. Is it a fact that there is more pneumonia in countries where the days are hot and the nights cold?—Yes.

2090. You say there is an excess of female mortality from phthisis over male in the Festiniog district?—Yes, there is; when you take them over 14 years of age. How the figures would work out if you took them between the ages of 25 and 65, I am unable to say.

2091. Is that state of things confined to Festiniog, or is it common to the United Kingdom?—If you take the United Kingdom the excess is in the males, except between the ages of 5 and 35 years; between those ages the females are higher, but under 5 years of age and above 35 more males die.

2092. (*Mr. Evans.*) All the evidence we have had from the medical witnesses has been given in regard to diseases or accidents which terminate fatally. We have had no evidence in regard to complaints from which the quarrymen suffer, but which do not terminate in death. Have you any statistics or information to give on that point?—I can only say this, that if you have a certain disease—say pneumonia—and you have 20 deaths, you roughly calculate that you have 200 cases of pneumonia in the district, because one in ten die. The ratio of deaths to disease has been pretty carefully worked out. Take typhoid fever, for instance, the ratio there is 1 in 16. Taking these figures, therefore, I should say that the most common diseases of the

quarrymen are pneumonia, consumption, and diseases of the alimentary system. Of course, there are the accidents as well.

2093. So that the figures as to cause of death indicate what are the prevalent complaints in the district?—Yes. At the present time there is no system of notification of diseases—ordinary diseases—so that you cannot get at the figures, but I have no doubt it will come to that some day.

2094. What made me ask that question was a note made by Dr. Ogle, to the effect that the quarrymen may be suffering from some diseases, but that they do not die from them?—I have taken all the diseases of every system, such as the nervous system, the circulatory system, the alimentary system, and so on, into account, and I have given the figures of every one of them.

2095. (*Mr. Jenkins.*) Is it not possible that in the case of a weak chest caused, say, by the effects of dust and so on, another disease may set in, from which the man may die?—I look upon the occupation of the quarryman, and the circumstances surrounding him, as factors.

2096. It has a bearing on the question?—No doubt the fact that he works under-ground is one factor, and the moisture under-ground is greater, I have no doubt, than outside. The smoke, the products of combustion, the dust you get there, and the wet clothes and the dampness which are inseparable from the occupation.

2097. In arriving at the comparative table, do you think you had a sufficient number of men to afford you a fair basis for comparison?—Dr. Ogle, in the figures which he gives in his book, takes all males throughout England and Wales, and in the case of stone and slate quarriers, for instance, he finds that the mortality figure is 1,122. His figures are based on the years 1880, 1881, and 1882, but he did not go through the registers for those three years. He simply had a sample figure and took a case here and there and compared it with that. I have gone through the registers of death in this registration district from 1883 to 1892, and have taken every death during those 10 years, and not simply taken a sample here and there. The figure is small, but at the same time, if I may be allowed to say so, I believe I have got as near as possible to the truth.

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2098. (*Chairman.*) As far as the comparison between the slate quarriers and the non-quarriers is concerned it is correct?—Yes, quite correct.

2099. (*Mr. Jenkins.*) I believe that Dr. Ogle gave as his reason for not separating the stone quarriers from the slate quarriers the fact that the figures would not afford a sufficient basis?—I do not know what Dr. Ogle's reason was. All I know is, that in his books he does not separate them. He says he does not know the districts, and that he has no knowledge of slate as compared with stone. I have confined myself to slate, that being the industry here.

2100. But as it is, the deaths from respiratory diseases are higher than in other occupations?—Yes, it is undoubtedly high. It is 502 in the case of the Festiniog quarrymen, as against 402 in the case of the males throughout England and Wales.

2101. Is it higher than in the case of carpenters and joiners, for instance?—The mortality figure of carpenters and joiners is 820.

2102. I am referring now to deaths from phthisis?—The figure from phthisis of carpenters and joiners is 204, exactly the figure that I have put down as the figure for the Festiniog quarrymen. Dr. Ogle's figure for stone and slate quarriers is 308.

2103. That only included phthisis?—Yes.

2104. (*Chairman.*) What is the comparative mortality figure of medical men?—1,122, I am sorry to say.

2105. (*Mr. Greaves.*) And that is higher than that of the Festiniog quarryman?—Yes.

2106. (*Mr. Jenkins.*) What have you compared the figure as to accidents with?—With the figures for England and Wales, and with the figures given by Dr. Ogle as to stone and slate quarriers.

2107. Is the figure as to accidents higher than in the case of the under-ground quarryman than it is throughout England and Wales?—I could not tell you. The figure for the Festiniog quarryman works out higher than Dr. Ogle's figure for stone and slate quarriers.

Mr. William Williams, Penrhyndeudraeth, examined by the Chairman.

Mr. W. Williams.

2108. What is your occupation?—A rockman.

2109. How long have you been working in the quarries?—For 25 or 26 years.

2110. And how many years have you worked under-ground?—I have been all my time under-ground.

2111. What can you suggest, or what information can you give us that will help us to make the work safer, both as regards life and limb and less dangerous to health?—There are some of the special rules that we want modifying. They have not been framed for quarrymen especially, and some of them are quite impracticable.

2112. What quarry do you work at?—At the Lower Oakeley. For one thing I should like to refer to rule 72. That rule states, that "no iron charger or scraper shall "be used for charging a hole with any explosive."

2113. What improvement or change do you wish for in that rule?—The matter has been considered by about 50 of the men, who met together for the purpose, when we prepare a hole to blast, and the rending has commenced, we put a piece of paper to cover the powder. It is necessary that we should put the scraper down with the paper in order to push it to the bottom of the hole. Sometimes it will be two yards deep, and then we let the powder down so that it may drop along the side. We are, therefore, obliged to use the scraper to put the paper in. On other occasions we cut a wide piece of paper and put it down the rent caused by the pillaring, and the scraper in it. We consider the practice perfectly safe, and not one of us can point to an accident that has happened through putting a scraper with the paper down into the hole.

2113*a*. Why did the workmen not ask for some alteration when the rules were first proposed, and when they were informed by notice that they might propose any alteration in them?—I do not know very well myself, but I believe that half the workmen did not understand them properly. They are taking more notice of them these days.

2114. Would not a copper scraper do the work equally well?—Yes, it would, but is it right to add to the expense when the iron scrapers do not cause any accidents?

2115. (*Mr. Evans.*) Could you not use a wooden one for that purpose?—We require it to be a very fine and strong one, and wood would be too weak. We cannot get a wooden one firm enough to keep the paper in its proper place.

2116. (*Chairman.*) Have you anything else to say?—Yes, with regard to the bugle. When we have been blasting, we cannot at all times put the bugle back in the chest without incurring some risk.

2117. Will you explain exactly what you mean?—Sometimes, after blasting, the block will have been moved just a little, and we may want to blast again in order to move it a little. Under those circumstances, if we have to take the bugle back to the chest, we have to face danger in so doing.

2118. Who compels you to take the bugle back to the chest under those circumstances?—They tell us that we must keep it in the chest.

2119. (*Mr. Evans.*) Who tells you that?—The agents tell us; they have seen the bugle close by me, and I was told to take it to the chest. I explained why it was left there.

2120. (*Chairman.*) And what did he say then?—He said nothing at all.

2121. (*Mr. Evans.*) He gave you to understand, in the way he spoke to you about it, that he did not approve of the practice?—Yes; he said it was to be in the chest—that the chest was the proper place for it. I would recommend that the wording of the rule be altered so that it might read that we are to keep them in a safe place, instead of compelling us to keep them in the chest.

2122. What suggestion have you again?—I would suggest that the same inspector should have control of the quarries inside and out, and that if one inspector is

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not sufficient, another practical workman be appointed to assist him. I think Dr. Foster's visits are rather infrequent, because his district is too extensive.

2123. What other suggestions have you?—I should like to refer to the railway arrangements on the Festiniog Railway. The carriages that the men travel in are much too small. They are only 9 feet long, 4½ feet broad, and 4 feet 8 inches high. Sixteen men have to ride in them, and the ventilation is very defective.

2124. Are the carriages for the workmen special carriages, or are they the ordinary third-class carriages?—They are special carriages, and they are kept in a very dirty condition.

2125. Do they get special cheap fares?—Yes, they do.

2126. Are they cheaper than the ordinary third-class fare?—Yes.

2127. Would you be willing to pay more if you got better carriages?—I cannot say. There is another danger in connexion with the railway. There is no inspection of the line before the train goes up in the morning. A tree may fall across the line, and the train run into it.

2128. Has that happened within your knowledge?—Yes, it happened quite recently.

2129. (*Mr. Greaves.*) And was anyone hurt?—No; no one was hurt, but the chimney of the engine was broken. There is no light provided in the carriages, except the candles that the men themselves provide. Candles are not a safe way of lighting the carriages, because if a carriage went off the line there would be some danger of it going on fire.

2130. (*Chairman.*) Then the workmen carry their own candles in the train?—Yes; and there is no other light.

2131. (*Mr. Jones.*) How many lights would there be in each carriage?—Two candles, sometimes more, and sometimes only one.

2132. (*Chairman.*) Are the times of departure convenient for the time to commence and leave off work?—Yes; but in case a man is ill, or has met with an accident, or anything of that kind, or the weather is wet, he is not allowed to travel by any train except the workman's train. He can go by the 1.0 o'clock train, if he likes, by paying 4*d.* extra, but he cannot go by any other train except by paying the ordinary fare.

2133. If you were to live at Blaenau Festiniog, would not these difficulties be prevented?—As far as I am concerned, it is a personal matter with me. I am a widower, and live with my sister.

2134. Are the times of the trains convenient in the morning and in the evening?—Yes, the times are convenient morning and evening.

2135. But the mid-day arrangements, you say, are inconvenient?—Yes; very inconvenient.

2136. Is there any difficulty in getting away on Saturdays?—No.

2137. Have you anything else to say?—No, I have not.

2138. (*Mr. Jenkins.*) I suppose you do not go to Penrhyndeudraeth every night?—No, I do not.

2139. (*Chairman.*) Do you live in barracks here?—Yes.

2140. In the village or at the quarry?—In the village close by.

2141. And are they comfortable barracks?—Yes.

2142. And clean?—Yes, they are. The officers of the Local Board say they are the best at Blaenau Festiniog.

2143. (*Mr. Jenkins.*) Is the rule you have referred to as to the powder bugles generally understood as you have stated?—Yes.

2144. It is generally understood by the men in the same way as you understand it?—Yes, it is.

2145. The men are under the impression that they have to take it to the chest if they have any spare powder in it?—Yes.

2146. We had a suggestion by one of the witnesses yesterday that walls be erected in the disused levels. What have you to say to that?—I think it would be a very good plan, and I would recommend that it be carried out. I would also suggest that the recent improvements we have had at the Oakeley quarries should be introduced into the other quarries. For instance, the roof should be inspected periodically. If the same care had been taken for the last 15 years as has been taken during the last two years, accidents would have been much less frequent.

2147. It was suggested that a minute inspection should be made of every place before it goes out of reach, and that a record should be kept of the inspection in a book. Would you approve of that?—Yes, I would, most certainly.

2148. It was also suggested that the water be stopped from running into the chambers; that is, the water that streams into the chambers—what do you think of that suggestion?—That has been done to some extent for some years past, but it is not possible to do it in every case. I have been working in a place where the water came down, and they could not see their way clear to divert it, nor to prevent it in any way. They were anxious to do it if they could, and they asked me if I could suggest anything and I said I could not.

2149. But where it can be done you think it ought to be done?—Yes, certainly.

2150. By what means?—That a dam of clay should be made across the chamber, so as to divert the water into some other direction.

2151. Would that not be too costly a method?—No; it would pay the owners and the workmen as well.

2152. (*Chairman.*) Have you anything else to suggest?—I would also suggest that the Wells light be adopted throughout the quarries in order to inspect them. In a place where I was working there was a "scribe" 10 yards high, and was not wide enough for you to put a halfpenny in it. You could not see it with a candle, but you could see it with the Wells light. That occurred three weeks ago.

2153. (*Mr. Jenkins.*) Is it possible for you to make every place quite safe before you leave it?—No, it is not. You cannot get every place solid; and where you cannot get that, I would recommend that frequent visits be made to the place to inspect it. A record should also be kept in a book of the state of the place when it was last inspected, and then after the lapse of another month they could see what places ought to be visited.

2154. Do you approve of the suggestion which was made this morning by Mr. Robert Roberts that all quarry managers and sub-managers should hold certificates?—Yes, I would most certainly approve of that.

2155. Would you approve of the suggestions made as to inquests; have you heard the suggestions that were made here to-day on that subject?—Yes, I heard them.

2156. And do you approve of them?—Yes. I consider they should be more like collieries. I have been working in a colliery myself. As a rule, the tradesmen do not understand the quarry terms, and consequently they cannot properly understand the witnesses.

2157. With the exception of what you have referred to, do you approve of the special rules?—No; I would recommend that others be added to them.

2158. You mean that rules should be framed to carry out the suggestions that have been made?—Yes. For one thing I would add to the special rules that all the chambers be examined every six months, as they do now at our quarry to a very great extent.

2159. (*Chairman.*) Have you anything else to suggest?—No, I have not.

Mr. W. Owen.

Mr. WILLIAM OWEN examined.

2160. (*Chairman.*) Where do you live?—At Festiniog.

2161. And you are one of the managers of the Oakeley quarries?—Yes.

2162. How long have you been a quarry agent?—For 16 years.

2163. And what were you prior to that?—I was for eight years before at the same quarry. I worked for three years as a quarryman, and for five years in the office.

2164. Were you working above-ground when you worked as a quarryman?—Yes.

2165. (*Mr. Jones.*) For the three years?—Yes; and I was in the office for five years afterwards, and then agent for 16 years.

2166. (*Chairman.*) You have heard a good deal of the evidence that has been given?—Yes, I have.

2167. Can you give us any suggestions for making the works safer?—No, I cannot give any suggestions, except that every care possible should be exercised by both workmen and managers.

2168. What is your opinion as regards danger increasing with depth, or otherwise?—I believe that the greater the vertical depth of the "wall" is, the greater the danger.

2169. But the further you go down along the dip of the slate vein does it become more dangerous or not?—I do not think it does in itself. I do not think the mere extension of the pillar down to the bowels of the earth makes it more dangerous.

2170. (*Mr. Greaves.*) You heard Mr. Roberts's evidence as to the periodical inspection?—Yes.

2171. And you confirm all that Mr. Roberts said?—I do.

2172. And you have nothing further to suggest?—No. I consider it part of my duty to inspect as well as to see after the men, and I do so every day.

2173. You are of the same opinion as Mr. Roberts as to the advisability of appointing an under-inspector; you heard Mr. Roberts say he did not think it would be of any use?—Neither do I think it would be of any use.

2174. You think the present staff quite sufficient to make every necessary inspection?—Yes, I do.

2175. With the assistance of Dr. Foster, the Government inspector?—Yes, certainly.

2176. And you think the special rules are generally sufficient?—Yes, I do, generally speaking.

2177. If they are strictly observed they are sufficient?—Yes, they are.

2178. Have you any difficulty in enforcing the rules at your quarry?—Yes, we have a little difficulty. There are some rules which the men cannot obey very well.

2179. I do not suppose you insist unreasonably upon any rule?—No. I rely on the words "reasonably practicable."

2180. (*Mr. Jones.*) Do you consider those words an addition to or a deduction from the rules?—As an addition to them. You judge the thing by your own reason, or that is how I do.

2181. (*Mr. Greaves.*) What steps are taken to inspect the ropes and machinery at your quarry?—Our chief engineer makes a periodical examination of all incline ropes and the machinery and chains.

2182. He is a special officer for that work?—Yes.

2183. And he is responsible for it?—Yes; and he keeps a record of what he does.

2184. And your bridges are examined, I suppose?—Yes.

2185. Is that part of his duty?—No, that is done by the foreman carpenter.

2186. And that is periodically done?—Yes, it is.

2187. If any complaint is made by any quarryman, I suppose it is immediately attended to?—Yes; it is always attended to at once.

2188. (*Mr. Jones.*) Can you produce the plans that I asked Mr. Roberts for?—He will do so, or I will, later on. As to the area excavated under-ground, I think it works out at our quarries to 220,000,000 cubic feet, or thereabouts.

2189. But what would the area be?—It would be about 450,000 square yards.

2190. Can you give me the length, say from east to west?—You cannot do it very well, because it varies In the Lower quarry it starts very much more to the east than in the Upper quarry, so that you cannot take a mean figure. I have worked it out in sections, and I think it will work out to 450,000 square yards.

2191. What is the length of the wall?—We have 21 floors, and taking each to be 90 feet along the clay slant, that would make from 1,800 to 1,900 feet.

2192. And that would mean the length of the slate "wall"?—Yes.

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2193. You say you do not believe that the works are getting more dangerous as you go down?—I do not see that they do. I do not think there is any more superincumbent mass above the bottom floor than there is above, say, the 10th floor from the bottom. I believe you will get as much superincumbent mass above that floor as the lower floor, when you go far enough west.

2194. The danger will not increase as you go down, becouse the arch roof will take off the weight from the beam roof, is that your opinion?—Yes, it will undoubtedly, until the arch becomes too great.

2195. It depends upon the mountain?—Yes.

2196. And the span of the roof?—Of course.

2197. With regard to Cwmorthin, do you think that the fact of Cwmorthin being worked up to your quarry in itself extends the span of your roof?—Of course it does. It increases this 450,000 square yards.

2198. I asked Mr. Roberts about the reposing angle of the slate, do you agree with what he said?—Yes.

2199. What do you take it to be?—About 25°, I should think.

2200. From 20° to 30°?—Yes.

2201. And that is the smallest angle that you have got in the quarry?—Yes.

2202. All others are steeper?—Yes.

2203. So the quarries are like a pack of cards in your hand?—Yes, but you cannot play with them.

2204. As to the special rules, would you like to have them revised?—There is one in particular, which was referred to by Mr. Roberts, I mean the 73rd rule, as to the wooden rammers. I consider that rule to be quite impracticable.

2205. I only want your opinion in a general way, would you like to see the special rules enforced throughout the district?—I would.

2206. Why?—Because I believe they would do good.

2207. You think it would be advisable to have uniform special rules?—Yes, because when men go from our quarries to work, say to the Votty and Bowydd, they have not got the same rules there as we have, and *vice versâ*. We find a difficulty in getting men who come to us from other quarries to comply with our special rules, whereas if they were uniform there would be no difficulty.

2208. And there would be no lack of discipline?—There would not be to the same extent, but I should like to say a word with regard to the evidence of the last witness, as to the powder bugle. I think he went a bit too far when he said that we insisted upon his taking it back when they wanted to put a second blast in. That is not what we do. If we see that a man is not quite certain whether he wants a second charge or not, we never say a word to him about taking the bugle to the chest, but when we see the men working on the forebreast, and three or four pounds of powder in the bugle, we then interfere. They may not want it in that case for hours.

2209. You can see at once whether they want it soon or not?—Certainly, we can see that from the nature of the work they are doing.

2210. (*Mr. Evans.*) You say you do not think the quarries become more dangerous as the pillars extend in length?—No, I do not think they do.

2211. Do you think that time has anything to do in making any of them more dangerous in consequence of the weather, and the action of rain?—Yes, I believe the weather affects the slate to a very great extent, where it is subject to atmospheric influences.

2212. How far under-ground do you think that the influence of the weather extends?—It would not go very far; but the change of weather from summer to winter, as well as blasting, affect the slate rock to a great extent.

2213. How far down do you find the weather to affect it?—It depends how near you are to the open. If you go under cover you only find it to a very small extent.

2214. Do you find ice under some circumstances very far down?—Yes, very far down, but not under cover.

2215. And to that extent you think the weather has something to do with the condition of the rock?—Yes.

2216. (*Mr. Jones.*) What about the water, we had some evidence about water coming down from one floor to

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the other?—We do everything that we possibly can to keep the water on the highest level that we can. It stands to reason that it is to our interest to do that.

2217. Have you any means whatever of checking the water from going over?—Yes. We have troughs at every possible point we can put them on the surface, and ditches, and so on, to keep the surface water as far as we can on the surface, but there is always water percolating through and we cannot possibly avoid that. Dams are made wherever they can be constructed, and troughs and so on are made under-ground. It is to the interest of everybody to keep the water high up, and we do all we can in that way.

2218. Do you find that the slate rock is not so damp as you go down?—No, I do not think it is, because the water as a rule percolates from the upper surface.

2219. (*Mr. Jenkins.*) Do you say it is less damp in the lowest parts of the quarry than it is higher up?—There is less water percolating through.

2220. But you do not say there is less water?—No, there is more water.

2221. Where it is possible that water streaming over the rock can be stopped, you agree with the previous witness that it ought to be prevented?—Yes, certainly.

2222. Which side of the pillar are the men most inclined to undercut, when they do it inadvertently?—I do not know. It is easier to undercut the west side of the pillar than the east side, which is the west side of the chamber.

2223. When that is cut in that way it is cut more under, and not at right angles to the cleavage?—No, it is not cut nearly at right angles to the cleavage.

2224. Where it is properly cut it is quite at right angles?—Yes, but it never is cut at right angles.

2225. It is never cut at right angles?—No.

2226. Then how is it cut?—At a larger angle. If you were to cut the pillar at right angles to the cleavage it would lean to the west about 1 in 4 or 1 in 5. Ours lean about 1 in 9.

2227. Is it easier for the men to cut the other side of the pillar?—No, it is not so easy to cut the other side. It will not cut so clean.

2228. But supposing you had your slant under it?—It would be easier to undercut then.

2229. And there would be great temptation to cut it more vertical?—Yes.

2230. And if that were done, what would be the effect on the pillar?—It would weaken it.

2231. It would weaken it more than if the other side were cut to the same extent?—I cannot say that,—I do not think so.

2232. Then you do not quite agree with the answer given this morning?—I did not hear that answer given.

2233. (*Mr. Jones.*) You said that you cut at right angles to the cleavage?—Yes.

2234. Or to clay-slant?—It does not matter which,—there is not much difference between them.

2235. Is it 18 degrees?—It is not much.

2236. That is the same thing?—The line of pillaring is at right angles to the plane of cleavage.

2237. And you do not follow that?—No, certainly not.

2238. (*Mr. Jenkins.*) That is because you do not cut the other side in proportion?—No, that makes no difference.

2239. (*Mr. Jones.*) Which side would be the most profitable to the men to cut?—The west.

2240. If they were to blast the other side what would be the result?—It would "scribe," unless there was a slant underneath.

2241. (*Mr. Jenkins.*) Do you find any difficulty in getting the men sometimes to obey you in cutting the pillars?—Occasionally.

2242. And you do not always succeed in getting them made perfectly safe?—No, we cannot be present always. Of course they will not disobey in our presence.

2243. Nor can you inspect them as you generally go round?—Yes, we can.

2244. Can you always do that, and do it minutely?—Of course you cannot inspect every square inch of the wall, but you can inspect so far as it is reasonably practicable to expect a man to do it.

2245. Then can you inspect every square yard?—No, I do not think it would be necessary to do it to a square yard. When you have a hole on the west side of the "wall," for instance, which is perhaps 20 feet long, you do not examine every square yard of it.

2246. Can you say from the top or bottom of a pillar whether it has been cut safe or not?—No, you could not.

2247. Therefore you must go there and look at it?—Yes, in that case you must.

2248. With regard to special rule No. 74—it provides that, "if the shot goes off, but fails to do its work, a "person shall not re-charge the hole, nor put powder "into any rent made, until after the lapse of 10 "minutes, unless he can satisfy himself that there is "no fire remaining in the hole or crack." What do you think of that rule—is it possible to carry it out?—Not always, I should think.

2249. (*Mr. Jones.*) As far as it is "reasonably practicable," that can be carried out again?—Those words govern every one of the rules, in my opinion.

2250. (*Mr. Jenkins.*) Would it go far enough if the words "until after the lapse of 10 minutes" in that rule be left out?—I do not think it would make any difference myself. I do not quarrel with those words as far as I am concerned.

2251. If you were to re-charge where there is water—what about that?—That is an exceptional case, and I would allow a man to do it.

2252. He must do it at once?—Yes, and if there is water there is no fear of an explosion.

2253. Therefore the words as to the 10 minutes are not necessary?—But that is not the rule, that is an exceptional case. I think it is necessary to provide for cases in general, because you have got your own judgment which you can exercise.

2254. (*Mr. Jones.*) Can you carry out the 76th rule, as to pillaring holes; what is your experience as to that?—I believe you can with pillaring holes, as a rule.

2255. (*Chairman.*) What area of roof were you able to examine with the ladder that has been spoken of?—I think it was about 200 square yards, and the cost came to about 4*s.* 6*d.* per square yard. It was in chamber 16, floor K.

2256. It cost 4*s.* 6*d.* per square yard for the examination alone?—For the inspection and clearing of that portion.

2257. There was some of the roof taken down?—Yes, a small portion.

2258. Have you, in the Oakeley quarries, any chains for giving access to disused levels?—Yes.

2259. Is that general?—We intend to do it.

2260. Although there is no special rule requiring it?—No, there is not.

2261. Do you approve of the suggestion made by Mr. Roberts that quarry managers and sub-managers should have a certificate?—Yes, I do.

2262. And would you include in that certificate a practical knowledge?—Yes.

2263. And scientific knowledge as well?—Yes, sufficient scientific knowledge for the purpose.

2264. (*Mr. Evans.*) How often does the engineer inspect the ropes and machinery at your quarry?—Really, I cannot swear to that, but I think he does it once a month.

2265. And do you think, from your experience, that that has been the means of preventing accidents?—I daresay it has. We have changed ropes and other things before this at his suggestion, and I do not think we have had a single accident since he has commenced.

2266. Is there a record kept of the inspection he makes?—Yes, he keeps a record in a book himself.

2267. And is that book at the disposal of the inspector if he wishes to see it?—Yes, it is. He can see every book in the quarry, and there is nothing kept from him.

2268. (*Chairman.*) Is there anything else you would like to say?—I would like to refer to the question of manholes. It was stated yesterday that there was no

protection for the men during blasting, but it is our invariable rule to have a manhole provided for every chamber, which is not open to a floor above.

2269. A place to which the men can retire?—Yes.

2270. (*Mr. Jones.*) You mean a recess?—Yes, a place where the men can shelter. The recess could only be used for the first "thickness" or two, and afterwards it would serve our purpose for cutting a ceiling-*bôn*.

2271. What do you do with the next "thickness," after the first and second?—They would become very short. You would not require anything. If you open a chamber only 15 yards high, and get two or three "thicknesses," you come near the ground and do not require anything. I think you refer to the miners, who "roof" these places. They have to "roof" them, and they cannot get any protection at all. They must face it.

2272. (*Mr. Greaves.*) But there the danger is not so great?—No, but it may fall down.

2273. There is no danger of anything falling down?—Only from the roof.

2274. And that would be very small?—Yes.

2275. The great danger was, as pointed out to us, when a man ascended the face of the rock?—Yes.

2276. It might possibly fall down upon him?—Yes.

2277. But a miner does not run that risk?—No.

2278. (*Mr. Jones.*) With regard to the floor underneath the miners, what is the average angle of that?—If it is under the slant it is between 28° and 30°.

2279. Would the rubbish run over that by its own weight?—No, unless it was something very large. Small rubbish, as a rule, will remain on it.

2280. And that of itself will be a safety?—Yes.

2281. (*Mr. Jenkins.*) In some cases you cannot get chambers open at the top?—No.

2282. But, as a rule, these should not be encouraged?—No. No one will work without an opening if he can help it.

2283. They are very dangerous, are they not?—Yes, certainly. It was given in evidence yesterday that a certain witness had been intimidated, that the management of the late Palmerston quarry did not act fairly towards a certain witness in legal proceedings taken by the Government inspector against the company. I happened to be one of the officials of the late company, and to-day I am ready to prove that there was no intimidation whatever exercised towards that witness. He had exactly the same rights and the same fairplay as every other man in the quarries during the time that the Welsh Slate Company worked that quarry. I think I ought to say that, in fairness to the management of the late company.

2284. (*Mr. Jenkins.*) Do you know, of your own knowledge, that the prevalent impression in the district is otherwise?—I daresay it is, but I do not deal with impressions, but with facts.

2285. But there is an impression of that kind, is there not?—There may be amongst some people. Some people like impressions. Another thing I should like to say is this, that to my knowledge, for the 17 years I have been acting as sub-agent at the Oakeley quarries, there has not been a single fall of ground which can be proved to have been left through carelessness. I mean falls of ground of any kind. I believe a statement has been made to the contrary, but as far as my personal knowledge goes, I do not know of a single fall of ground which it can be proved was left through carelessness.

2286. (*Chairman.*) And you are speaking now of a period of 17 years?—Yes. After raising a ladder, when anything does fall down, our first question to the men who go there is, "Was it a thing which became "dangerous after the lapse of time, or do you think "it was left dangerous originally?" and the answer invariably is that it became dangerous after the lapse of time.

Mr. W. Owen.

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2287. (*Mr. Jenkins.*) We have had it in evidence by one of the most experienced workmen who looks into these things that he has seen many places of that kind. I refer to Robert Davies. He said he knew of many places where things had been left dangerous; did you hear that?—I disagree with him entirely. Of course, if that is so, he did not carry out the special rule. It was his duty to inform us at once if he saw anything of that kind, and he never did that.

2288. But he was sent there to bring it down, and to make the place safe?—Yes, after the thing happened.

2289. And he says that a good deal of what he has seen was the result of places being left in a dangerous condition?—I cannot say what he said. All I can say is that my experience is otherwise. He was led on by you to say something very like it, but he did not actually say that, I think. You questioned him about putting a hole in one block instead of putting it in the three, and he was led to say that he saw the effect of that on the walls, but he did not say that he saw anything dangerous on the walls. Of course the two are very different things.

2290. What about the suggestion of making a wall in the middle of a disused level?—I do not know really. It might be advantageous. I can say that our experience is that walls have been built in that way, and always taken down by the men themselves afterwards. I do not know why they do that. The fences that we put down are very much more substantial, and they are not taken away. It would, of course, prevent what you seem to wish to guard against, that is, the possibility of a blast throwing from one chamber to another.

2291. (*Mr. Greaves.*) Do you ever have occasion to pass through these levels to examine the workings?—Yes, we do at times, and in the future especially we shall have to do so. We intend to leave a chain at each of the disused levels, so that we may be able to go up the chain to examine the place. It is the duty of the men to warn the men in the next chamber when they are in the vicinity of an entrance to a level. I only know of one accident of that kind that has taken place during the last 17 years.

2292. (*Mr. Jenkins.*) Do you know of any cases where a stone has gone through levels?—Yes. I have seen them going myself many times, but not without the party who is blasting giving warning to his neighbour. They are bound to do that according to the special rules.

2293. They are required to do it, but there are very few cases in which it is needed?—Yes.

2294. And therefore they are apt to neglect it when it is needed?—Perhaps.

2295. We had it this morning that very few accidents have occurred from falls from the roof or from the sides of the pillars?—There have been none from the roofs during the last three years.

2296. Are there not falls from roofs, and so on, which do not happen to result in accidents?—Yes, there are.

2297. There have been some narrow escapes in that way?—Yes.

2298. Very narrow?—Yes.

2299. And they might have resulted in serious accident?—Yes, certainly.

2300. And very often to two or three men at once?—It would depend upon the number of men who might be standing there. Of course anything may result in an accident. If anything of the kind had fallen on a man it would have killed him.

2301. (*Mr. Evans.*) Did that come down during working time?—I do not know what Mr. Jenkins is referring to in particular.

2302. (*Mr. Jenkins.*) But you do know of falls of ground where the men have had narrow escapes?—Yes, from time to time.

2303. And have you known of recent cases of that kind?—Yes.

Mr. Hugh Griffith examined.

Mr. H. Griffith.

2304. (*Chairman.*) Where do you live?—At Prenteg, near Tremadoc.

2305. And what is your occupation?—Rockman.

2306. How long have you worked at the quarries?—About 27 years.

2307. Have you been working above-ground or under-ground?—Mostly under-ground.

2308. Have you any suggestions to make to us?—No; I have had no opportunity of thinking of anything. It was only last night I thought of coming here, but I shall be glad to answer any questions you may put to me.

Mr M. Griffith.

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2309. Had you sent your name in as being prepared to give evidence?—Yes, I allowed them to take my name last night.

2310. But your name was received on the 10th December?—I only gave permission last night for my name to be sent in.

2311. Have you any suggestions to make to us?—No, nothing in particular, as far as I know.

2312. (*Mr. Evans.*) Do you know of any practice that goes on at the quarries in any way that should be altered—anything that affects the life and limb of the men?—One thing I would like to suggest is that there should be proper inspection of the pillars of a chamber which has been worked out, before commencing to work a chamber below it.

2313. (*Chairman.*) Have you anything else to suggest?—I make that suggestion because I have been myself in a rather dangerous place, where there had been a little negligence in the chamber above me.

2314. (*Mr. Evans.*) What happened in that chamber?—Something dropped from the roof which warned us that there was danger. A ladder was erected and I went up, and I only just touched a loose piece and it fell down, and I had a very narrow escape.

2315. Had you any reason to suppose that that was in consequence of any carelessness?—It was the side of a pillar, not the roof overhead.

2316. Was it owing to carelessness in any way that it occurred?—Yes; that is the conclusion I came to at the time.

2317. And how long ago is that?—It is about three or four years ago perhaps.

2318. Have you any objection to say in what quarry that was?—No, not at all. My master is here to hear me. It was in the Oakeley quarry.

2319. The inspection they carry on at present had not been commenced at that time?—No; there was not so minute an inspection as there is at the present time.

2320. Do you think it is possible that there are some places in that quarry in the same condition at the present time?—It is possible, but I cannot say that there are.

2321. (*Mr. Jenkins.*) Do you believe that instances such as that occur in every quarry?—I cannot say that. I have not heard of anything quite similar.

2322. Were you here last night?—Yes.

2323. Did you hear the evidence of the other workmen?—I heard a little, but not the whole of it.

2324. Do you approve of the suggestions which have been made by them?—As far as I heard them, I agree with them.

2325. Do you feel any difficulty in carrying out the present special rules?—No, I have no special difficulty, although there are a few requirements—such as that relating to the bugle, and so on—that it is impossible to carry out in their strictness. I think it would be well to alter the rules in that respect.

2326. But taking them as a whole, you approve of those rules?—Yes, speaking generally.

2327. And you believe that they have done much good?—Yes; I believe they have in relation to some classes of workmen: Some men are far more careless than others, and they require something very strict to keep them in order.

2328. What time, in your opinion, is required for a labourer to become a practical workman?—It would take from three to four years, in my opinion.

2329. (*Mr. Jones.*) I did not quite understand whether you referred just now to your own bargain, or to another one. Was it from a pillar out of your own bargain that the piece fell, or from somewhere else?—Yes, over my own bargain.

2330. (*Mr. Jenkins.*) Do you believe that there are many men rather careless in cutting the sides of the pillars?—Yes, there is no doubt there are some. We very often find signs of great carelessness, but at the same time I believe those cases are the exceptions and not the rule. As a rule the men are very careful.

2331. (*Chairman.*) Did you tell the manager, or any of his assistants, that the side you complain of had been left dangerous?—Yes; I made a suggestion to that effect. The sub-agent happened to come to the place in a few minutes after the thing had happened.

2332. (*Mr. Jenkins.*) Is there any unwillingness on the part of the men to suggest that it was owing to the carelessness of other men that things of that kind happen?—I cannot say anything as to that. All I can say is that it would not be the case with me if I saw anything of the kind.

2333. (*Mr. Jones.*) You bring forward a case which occurred three or four years ago, and at the same moment you say you are pleased with the present inspection. I should like to know why you bring an instance of that kind forward?—What I mean is that there should be a special inspection of the pillars (where practicable) of a worked-out chamber before the one below it is commenced, in addition to frequent and periodical inspections with the Wells light.

2334. (*Mr. Jenkins.*) You approve of that inspection or examination?—Yes.

2335. And you suggest that there should be a man to see to places of that kind?—Yes, I do.

2336. (*Mr. Greaves.*) A special agent, or what sort of a man do you mean?—It would not matter, as far as I can see. Any man might be appointed who would do the work properly.

2337. (*Mr. Jones.*) It would make no difference who paid him?—No, it would not matter whether he was paid by the employers or by the Government.

2338. (*Mr. Greaves.*) But did you not say just now that it was done properly at the present time?—I said that light is being used periodically, and more frequently than was the case formerly.

Mr. J. Owen.

Mr. JOHN OWEN examined.

2339. (*Chairman.*) Where do you live?—At Blaenau Festiniog.

2340. And what are you?—A slate-maker.

2341. How long have you been a slate-maker?—For 35 years.

2342. What suggestions can you make with the view to improving the conditions of your occupation?—One thing is that the dust should be got rid of from the mills as much as possible. I also consider that other improvements are necessary.

2343. What are the other improvements you wish to have?—With regard to the dust, I would recommend that a door be placed near the dressing machines in the mills, as has already been suggested. I would also like to see the wheel which regulates the course of the table covered with a plate.

2344. You mean the reversing wheel?—Yes, I believe they are being made now, and perhaps they will be used throughout the mills generally in a short time.

2345. Have you anything else to say?—I may say that I have come here at the request of something like 80 men, and it is their opinion that the mills should be watered, especially during hot weather, with the view to laying down the dust. We are perfectly satisfied with the eating-houses that we have already provided for us. We consider that they are everything that could be desired. One defect that we should like to see remedied is the want of privy accommodation.

2346. Is there anything else you have to suggest?—With regard to the want of privy accommodation, I believe that if we were only to suggest it to our employers, it would be attended to.

2347. Have you ever suggested it to your masters?—Yes, we have done so, quite recently.

2348. Is there anything else?—We feel that the dust affects our health in a very special way, and we would be very glad if something could be done to minimise the ill-effects. There is plenty of air in the mills at present, but we should like to have the doors that I have already referred to, in order that some of the dust may be done away with. I do not think we can complain of the ventilation.

2349. For reducing the quantity of dust you suggest two things—a door behind the dressing machine, and watering in the summer-time?—Yes, that is so.

Mr. THOMAS DAVIES examined.

Mr. T. Davies.

21 Dec. 1893.

2350. (*Chairman.*) Where do you live?—At Tanygrisiau.

2351. And what are you?—A rockman.

2352. How long have you been a rockman?—I have been a rockman for 26 years, and I worked as a slate-maker for four years before that.

2353. After your 30 years' experience I have no doubt you can offer us some suggestions for making your occupation safer and healthier?—The improvement I should like to see would be a more minute examination of the pillars as we work our bargains.

2354. And what else have you to say or to suggest?—I agree with the greater part of what has been said already, with regard to the safety of the pillars, a pillar might be perfectly safe on leaving it, but it might become unsafe afterwards.

2355. Have you anything else?—There is a feeling among the men I work with that there are some of the rules which are not properly applicable to us as quarrymen.

2356. What quarry are you working at now?—At Llechwedd at the present time.

2357. Do you recollect these rules being posted up at the quarry some years ago, along with a notice as to any objections the men might have to them?—Yes, I do.

2358. Did you send any suggestion or complaint to the inspector at that time that the rules were not practicable?—Yes, we did as to the powder question,—about taking it in 25-lb. kegs instead of 4-lb. bugles, and we had other objections if we had had an opportunity.

2359. Did not the notice say that you had an opportunity of making known your objections?—It might have been so. I know that we talked about them about that time.

2360. But did you send any notice at the time about the rules?—Yes, as to the powder, and to the effect that it was difficult to carry that rule out strictly, as they seemed to require. We feel now also that it is impossible to carry it out.

2361. Did you send a letter about it, or who did?—The secretary of the men sent it.

2362. What was his name?—I think Robert Pugh was the secretary at that time.

2363. (*Mr. Jones.*) That is 12 years ago?—Yes, about 12 years.

2364. (*Chairman.*) Do you use a copper-tipped tamper?—Yes, we use them, but they will not bear being knocked with the hammer. They use the copper tamper first of all, and the iron tamper for the latter part of the tamping.

2365. Have you anythig else to suggest?—No, I have not.

2366. (*Mr. Jenkins.*) You use the copper tamper, therefore, instead of the wooden tamper?—(*No answer*).

2367. Therefore, you do not use the copper-tipped tamper, except for the first time?—Yes, that is all.

2368. We have heard it stated in evidence, that you keep the copper tampers on the shelf, and that you do not use them, is that the fact?—No, as far as my experience goes, it is not. The agents speak to me very strictly about them, and I believe it is the same with the other men, I have heard some of the other men say the same thing.

2369. Could those tampers be made so that you could use them alone, without using the iron tampers afterwards?—Yes, there are some of that kind now. We have had some new from Mr. David Williams, the smith, that will stand the work.

2370. (*Chairman.*) Are they bronze ones?—Yes.

2371. (*Mr. Jenkins.*) And that would answer the same purpose?—Yes, it is a better one than the others.

2372. Did you refer to any other of these special rules, when you said there were rules which are impracticable?—Yes, I consider the rule as to taking a lantern when we take the powder from the chest is also impracticable, when we are charging a hole, and have not enough powder, we have to go down and light the lamp and go and get some more.

2373. We have had evidence to the effect that there is an unsafe road, along which you have to go to your work, do you know anything of that?—It is quite safe except in frosty weather, I heard the evidence as to that, and I believe that if the matter were brought to the notice of the chief manager, that he would see to it and have it put right, if that can be done.

2374. (*Chairman.*) What is your opinion as to the road above the old floor?—I have never heard anyone complain of it.

2375. Can you walk along that road without a candle, is there sufficient light?—No, there is not, but from the office floor there is.

2376. Along the mill floor?—Yes.

2377. (*Mr. Evans.*) Is there sufficient light under the office floor?—No, we use our candles, except when it is clear in the summer.

2378. (*Mr. Greaves.*) Is there a good path there?—Yes.

2379. It is not on the incline at all, is it?—No, it is on the side of the incline.

2380. (*Mr. Jenkins.*) Is that the same as the one which is dangerous in frosty weather?—No, it is a different one. The one where the ice is found is lower down. There is no ice on the incline at all, but on another path lower down, the floor below the old floor.

2381. (*Mr. Greaves.*) How often is there ice there?—Every time it freezes.

2382. Do you say that it freezes down there?—Yes, it freezes there rather soon, because there is so much draught.

2383. (*Mr. Evans.*) What sort of a path is there from the office floor, as you call it, to the old floor?—Part of it has been paved.

2384. (*Mr. Greaves.*) Have you seen ice there this year?—Yes.

2385. Have you seen any this winter?—No.

2386. Has it frozen here this winter at all?—Yes, a little.

2387. So it does not freeze there every time there is frost?—There was a little frost there, but not much.

2388. (*Mr. Evans.*) What about the path, is it a fair one?—Yes, it is. I have not heard anyone complain of it, and I do not complain myself.

2389. Do you require a candle to go along?—Yes, most people would require a candle, but I can go without one, as I am accustomed to the place.

2390. I suppose you go down before it is quite daylight, and stay down until it begins to get dark?—We go down before it gets daylight, but we come up when it is light enough to carry the stones to the mill.

2391. If you go down at noon, is there sufficient light then?—Yes.

2392. (*Mr. Jenkins.*) Is that the path by the incline that you have referred to?—Yes.

2393. Could other paths be made besides that one?—Yes, but I have not heard any complaint with regard to it. The place is wide enough.

2394. Do you know if there is any place known to be dangerous in your quarry?—No, I do not know of any except the places from which they are pulling down as dangerous at the present time.

2395. Are there any inspections being made with a strong light, such as being made in other quarries?—Yes, but I want more minute examinations than those with a light. There are inspections with the light, but I do not think that is sufficient.

2396. What light is it that is used?—I do not know by what name they call it. It is a kind of lamp.

2397. Do you raise ladders often there?—I cannot say how often. There is one man who is continually employed to pull down what is dangerous.

Mr. J. Owen.

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Mr. JOHN OWEN examined.

2398. (*Chairman.*) Where do you live?—At Bryn Dinas, Rhiwbryfdir.

2399. What are you?—A rockman.

2400. And how long have you been working in a slate quarry?—For about 32 years.

2401. What did you do before that?—I worked on a farm.

2402. As a farm labourer?—Yes, until I was about 20 years of age.

2403. You have heard a good deal of what has been said here to-day?—Yes.

2404. Can you tell us anything more about the mode of improving the quarries and rendering them less dangerous?—I am working at the Oakeley quarries and there is a great improvement there compared with former years. I think there ought to be a light ladder say 15 or 20 yards long, for the purpose of examining places. The inspection made by means of the Wells light does a good deal of good, but I think it would be a great improvement if a light ladder were provided. When we examine with the light, as the light is on the floor, if a crack faces downwards we can see it, but if it is on the top or turns on one side, we cannot see whether it is a crack or a shadow caused by the lamp.

2405. Have you anything else to suggest?—I should like to see a wall in the middle of the level, instead of the fencing they have at the present time. I have known of cases where men were cutting a pillar, and a lump from the blast has come there. I do not know that any serious accident has been caused in that way, but there might have been one.

2406. Do you mean that a lump was blown from one chamber into another chamber?—Yes. When they are cutting a pillar on one side, a lump might come from that pillar right through the level to another chamber.

2407. Have you anything else?—I should like to see more superintendence over the men when they are with the ropes and chains. There is a good deal of carelessness in that way.

2408. Do you mean carelessness among the men themselves?—Yes, and they ought to be superintended whilst they are with those just as much as when they are with powder.

2409. Is there not a special rule to that effect?—I believe there are three lines, and only three lines, in the special rules about cranes and chains and ropes, and there are scores of lines in the rules about powder. I have never heard that a bugle of powder had exploded in a chest without a safe bottom, or because there was an iron lock on the chest instead of a brass one. There are scores of lines in the rules about the storage of gunpowder, but only three lines about the chains, and there have been many accidents, every year almost, through the breaking of a chain or a rope.

2410. Then do you wish to have some more rules about the chains and ropes?—I should like those things to be more carefully attended to.

2411. And who do you think ought to look after these things?—I think the workman should do so, undoubtedly. It is also his duty to look after the powder as well, but the agent will come there to see after the powder, whereas he will never ask if the chains are safe.

2412. (*Mr. Evans.*) What you want is that the agent should look after the ropes as well as he looks after the powder?—Yes, better than he looks after them at present.

2413. (*Chairman.*) Have you anything else to suggest?—I should like if someone well acquainted with the work came oftener to examine the places.

2414. What quarry do you work in?—In the Oakeley.

2415. Have you anything more to say?—No, I do not remember just now.

2416. (*Mr. Jenkins.*) Do you approve of all the suggestions made by Richard Griffiths and O. R. Jones, and other witnesses who have given evidence here to-day?—Yes, I do.

2417. And is it your experience that there is sometimes great neglect on the part of the men?—Yes, in the direction I have stated; with regard to the chains and ropes and so on, I believe it would be better if there was an inspector who could come round oftener than the present inspector is able to do.

2418. And therefore you would suggest that the responsibility should not rest entirely with the workman?—If it was properly examined by the inspector it would be off his shoulders afterwards.

2419. And that would tend to make the men themselves more careful, you think?—Yes, it would, in my opinion. Some of the men are more careless than others.

2420. Are they more careful when these special rules are enforced than they were before that?—Yes, I believe they are.

Mr. R. J. Jones.

Mr. ROBERT JOSEPH JONES examined.

2421. (*Chairman.*) Where do you live?—In Newmarket Square.

2422. And what are you?—A slatemaker.

2423. At what quarry?—Oakeley.

2424. And how long have you worked there?—For 43 years.

2425. Have you heard the evidence given by the witnesses generally this afternoon?—Yes, I have.

2426. And have you anything to add to what they have said?—No, nothing at all; but there is one thing that John Owen did not refer to—the ventilators in the roof of the mills.

2427. But do you agree generally with what they said?—Yes, I do, entirely.

2428. And the only addition you have to suggest is the fixing of a ventilator in the roof of the mills?—Yes, that is all that I can suggest in addition to what John Owen has suggested. I agree with what he said.

2429. Do you work in the same mill as John Owen?—Yes, I do.

2430. (*Mr. Jones.*) How do you want the ventilation—would you rather change the current in the mill, and instead of the current being as it is now, have it running higher up, and running right through the ventilators?—I should like to have the doors on the dressing machines, as has already been suggested. There are doors which shut to prevent the wind coming through the large doors. When those are closed, I should like to have ventilators in the roof, so that the dust might ascend through those.

Mr. H. Jones.

Mr. HYWEL JONES examined.

2431. (*Chairman.*) Where do you live?—I am living at Tanygrisiau since last week.

2432. And what are you?—A rockman.

2433. How long have you been a rockman?—I have been working in the quarries for 33 years, but I have been away for six or seven years. I have been in Festiniog for 33 years.

2434. And you have been employed the greater part of that time as a rockman?—Yes.

2435. What suggestions have you to make to us for improving your occupation?—For one thing I would suggest that there should be a thorough examination of every chamber before the rockman commences his work there.

2436. You mean when the miners leave it?—Yes, quite so. That examination should be made by an experienced man. Of course, any other man could not do it thoroughly.

2437. What else have you to say?—I think there should be a wall across every disused level. I think that has already been suggested.

2438. You mean that there should be a wall if there is any chance of a stone being thrown by a blast from an adjoining chamber?—Yes. I think there have been

some accidents in consequence of that. Some of the witnesses have stated that they do not know of any accidents of that kind, but there was one about eight or nine years ago. I am certain of that.

2439. Was anybody killed?—No, he was not killed. He is working now. It was a very serious accident, and, of course, I can give the names if it is disputed.

2440. You also suggest the examination of the roof of a chamber when left?—Yes.

2441. And the closing of disused levels?—Yes.

2442. And what else have you to say?—I very often have an opportunity of seeing your report; and from those I find that a great many men are injured by the cranes. I would suggest that there should be some provision made with regard to cranes, so that men may not injure themselves in lowering stones. I know that it is carelessness on the part of the men, to some extent, that causes the accidents; they do not think much about it until they get a blow.

2443. When do the accidents most frequently happen with the cranes—in raising or lowering?—As far as my experience goes they always happen when stones are being lowered.

2444. Do you think it would be a good plan to have a brake to use in lowering?—Anything that would tend to reduce the number of accidents would be a great boon to the men.

2445. Then you would suggest an improvement in the cranes?—Yes.

2446. Have you anything more to say?—I think it would be very desirable to have a more thorough examination of every layer or "thickness" of rock before it is left, and before it gets out of reach.

2447. That the sides of the pillar should be examined?—Yes, all along from top to bottom, because no quarry manager, or anybody else, can see the middle of the floor from the bottom, nor yet from the top, as some floors in some of the quarries are about 30 yards long.

2448. Have you any other suggestion?—No, I cannot remember just now.

2449. (*Mr. Jones.*) With regard to the cranes, what do you consider is the chief point that should be looked to?—The first thing will be to see that they are handy to work with.

2450. Can you suggest anything—what about the brake—would that make the crane more cumbrous, or would it add to the utility of the crane as an instrument for the work?—I think it would be possible to invent a crane where the brake would not interfere at all with the lifting. All the accidents happen in lowering stones.

2451. What about the weight of the crane?—I do not see that the brake would interfere with that.

2452. Would it not add to the weight?—Yes, it would, if you wanted to shift it from one place to the other, but it would not interfere very much with the handling of the crane, as far as I can see.

2453. But you know, as a practical workman, that anything that will add to the weight of the crane, or that will be difficult to move it about, will be complained of?—I think the crane is very fair now, because there are some improvements compared with what they were. For instance, there is a better place to put oil on, and of course that makes it easier to work.

2454. What about the speed of the crane; is that not an element in a good crane?—Of course if we get more speed we shall want more power to lift it.

2455. For instance, when you put a worm on it you strengthen the crane at the expense of diminishing the speed?—I have not had any experience of that.

2456. You object to the worm because you do not get the speed?—I cannot say anything as to that, because I have never had any experience with it.

2457. (*Mr. Jenkins.*) Do you think that the workmen would take to it if it made much difference?—I do not think it would make very much difference.

2458. (*Mr. Jones.*) Is it not your custom now to "lower out," as you call it?—Of course we have been doing that very often.

2459. And you do it now, I suppose?—Yes.

2460. With what object?—(*No answer.*)

2461. To gain time?—Yes, of course.

2462. (*Mr. Jenkins.*) Did you hear the evidence given by the other witnesses?—I heard some of it.

2463. Did you approve of the suggestions made by the workmen, so far as you heard them?—Yes, generally speaking. There is one thing I should like to refer to. There was a question asked by Mr. Jones to one of the witnesses. The witness had mentioned an incident which took place in connexion with something dangerous three or four years ago, and afterwards he stated that a great deal of care was being taken now, within the last two or three years. I believe there is more care taken now at the Oakeley quarries in the way of inspections than at any other quarry. It may be, however, that in two or three months I shall be working elsewhere, and I think these special rules ought to be in force at every quarry. This would be a great convenience to the men, because, as Mr. Owen stated, men who have worked at other quarries where they have not been accustomed to these rules find it difficult to obey them when they come to work at the Oakeley quarries.

2464. And you consider that the precautions taken there ought to be made compulsory in other quarries?—Yes, I believe so, because, as was stated here this afternoon, this slate quarrying industry is more dangerous to life than any other industry in the country; I mean in regard to accidents.

2465. Did you hear the evidence of Mr. Roberts this morning?—No, not the whole of it.

2466. Did you hear his suggestion that all quarry managers and assistant-managers should have certificates of competency?—Yes, I heard that.

2467. And what do you think of the suggestion?—I believe if that were carried out, it would be a very good thing. It would benefit both the quarry owners and the workmen. There should also be an experienced working quarryman on the staff of every quarry.

2468. Should the certificate require that he should have been working himself as a quarryman, and have had considerable experience in the work?—Yes, and I would suggest that he should be experienced in working under-ground.

2469. As well as above-ground?—In my opinion, under-ground experience is what is wanted. I cannot see that experience above-ground would meet our requirements, because that would be of no use under-ground.

2470. We had evidence this morning as to that. Do you think that the work of the under-ground workman, and that of the above-ground workman, are quite different?—Yes, they are quite different.

2471. And the great majority of the above-ground men do not understand anything about under-ground work?—The majority do not.

2472. Nor does the under-ground workman understand anything of the other work?—No; of course not, in the way of slate dressing.

2473. What would be sufficient time for a man to become an experienced rockman; how many years?—It all depends upon his ability. There are some men that will learn more in two years than others would do in 22 years.

2474. But what would be the average time necessary; would two years do?—No.

2475. Would you entrust a rock to a man who has only had two years' experience?—No, I would not. If I had a rock to let to anybody, I would never let it to such a man.

2476. And do you believe that the employer would be be the loser if that were done?—Yes, he would be, undoubtedly.

2477. Although the man might be a good workman?—Yes, of course. To bore a hole is one thing, but to know where to put it is quite a different matter.

2478. Do you believe that the inspection you referred to ought to be made by someone other than the workman himself?—Yes.

2479. Why do you suggest that?—For this reason. The general way of working here is this: When they commence to work a chamber, they work by the day as a rule, and the partner who works in the mill gets so much poundage. Supposing a man has one or two children working there, say one working as a rubbisher. If the rubbisher has plenty of blocks he can earn 2*l.* or 3*l.*, and the man himself would

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get 30*s.* or 2*l.* more every month. If there is not a strict inspection kept, the man is under a great temptation not to be as careful as he ought with anything that is dangerous. We must acknowledge that some of us are very fond of money, and we want to get as much as we can of it. There is great temptation, also, for the quarry owners to push on as much as they can for the sake of getting slates. Slates are what pay the owners, and they are the very things that pay the men—that is to say, we get more money the more slates we get, as a rule.

2480. (*Mr. Jones.*) With regard to your knowledge of the special rules—how did you become acquainted with them—did you become acquainted with them by reading them, or by working and observing how they are kept by the managers and everybody around you—how did you come to your present knowledge of them?—I read them very often. It is a very difficult matter to obey them strictly, but I do not remember that I ever broke one of them, I know I was cautioned once by Mr. Owen, and that was simply because I had left a bugle with a little powder in it. I had fired a hole, and I knew I would want some powder again soon afterwards, and so I left it there. He and Mr. Roberts happened to come round just that very minute, and they found the bugle on the chest. That was the only time I was ever cautioned even. It is very difficult to comply at all times with the special rule which requires us to take the bugle back to the chest.

2481. You have stated that you read these special rules very often—do you read them to refresh your memory, or do you read them with the view of acquiring a more thorough knowledge of them?—I do it for both purposes, because I do not want to run the risk of being fined or anything of that kind. I have never been fined yet, and I do not want to begin either, if I can help it.

2482. You did not quite understand the rules, I suppose, at the time they were first introduced, and when you were asked to give notice if you objected to any of them?—No, I did not.

2483. Do you think that the managers and inspector and everybody concerned understand them now,—as far as you are able to see?—No, I do not think they do all through, because they have been altered. At one time we were allowed to tamp the hole with an iron tamper, but we had to take a brass one to commence the first and second. At the present time, however, we are not allowed to handle the iron ones.

2484. (*Chairman.*) Where is that stated in the special rules?—I do not know where it is stated, but we as workmen have been told that.

2485. (*Mr. Jones.*) You have got that impression, at any rate?—They are strict orders.

2486. Are they enforced?—Yes.

2487. (*Mr. Jenkins.*) You have strict orders not to keep iron scrapers in your possession?—Yes, we have.

2488. Have you ever had an opportunity of objecting to these special rules, or any of them?—No, we have not, so far as I can remember now.

2489. Has any workman in the lower quarry ever had an opportunity of objecting to them?—I cannot say. We did object to the rule as to the powder. We had plenty of fighting over that.

2490. As a matter of fact, you did approve of the rules with the exception of a few of them?—Yes, that is so. Generally speaking, we approve of these rules, and we are satisfied that they have been framed with the object of saving life and preventing accidents.

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Mr. THOMAS JONES examined.

2491. (*Chairman.*) Where do you live?—In Cwmbowydd Road.

2492. And what are you?—A rockman.

2493. At which quarry do you work?—At the Votty and Bowydd.

2494. How long have you been a rockman?—For about 29 years, and I worked as a labourer for about two years before that.

2495. And what do you wish to tell us about the improvements that you have thought of?—I should like to say this to commence with. I quite agree with a great many things that have been said here this afternoon.

2496. Have you been here all the afternoon?—Yes, I have. I would like to suggest one thing that I and many of my co-workmen consider necessary. We consider that every new chamber that is being opened should be opened on the true pillaring of the rock, so that there will be no curve at all in it.

2497. Have you anything else to suggest?—Our reason for suggesting that is, that we believe it will tend to the safety of life in the future.

2498. Have you anything else?—We believe that accidents have been caused in the past owing to the fact that that practice has not been carried out. When we cut on the western side of the pillar it has a tendency to "scribe" and undermine the pillar, and in course of time that leads to a serious state of affairs. If a crack occurs on the eastern side of the pillar, if a "scribe" occurs, you cannot see the crack, as it goes down; but if a crack happens on the western side, it cracks upwards from below, and you can then see it by means of the light.

2499. What else have you to say?—I have nothing more.

2500. (*Mr. Jenkins.*) What light do you use at your quarry?—Cotton waste and oil is what we have.

2501. (*Chairman.*) Do you think that is better than the Wells light?—I have never seen the Wells light, and therefore I cannot say which of the two is the best.

2502. Are you able to make a satisfactory examination of the roof with the light you have described?—I do not believe you can unless you go there to examine it.

2503. By sounding it with the hammer you mean?—Yes. If you go there in the morning, when there is not much smoke about, you can see whether there is anything loose from below.

2504. Do not the cotton waste and oil blacken the roof and cover it with smoke?—No.

2505. (*Mr. Jenkins.*) The cotton waste and oil which you have referred to is used as a torch?—Yes.

2506. And how long would it last?—I should think one of them would last from 10 minutes to a quarter of an hour, or something like that.

2507. You do not think that it is a very efficient way of examining the place?—Yes, it is, if you raise ladders up; but I do not think that a light alone is sufficient to examine anywhere.

2508. Do you not think it would be a great deal better if you had a light like the Wells light, or something of the same strength, a light that would light up the whole of the chamber, so that you could work in it without a candle?—I know nothing of the light you refer to, and so cannot express an opinion.

2509. Have you great heights in your quarry?—I think the greatest thickness as far as I recollect is from 40 to 45 yards from hard to hard.

2510. (*Mr. Jones.*) What vein do you refer to?—To the Old vein.

2511. (*Mr. Jenkins.*) Is that the thickest?—Yes, it is. We work the Old vein, and what we call the 2 A vein together, and the two together are about the thickness I have stated.

2512. That is the only way in which they make inspections at your quarry, by that sort of light?—They raise ladders up, and if anything has come down they go there and try to make the place secure.

2513. Do they raise these ladders to a very great height?—The longest ladder we have at our quarry is about 14 yards long, I think.

2514. Have you any places at the quarry which are known to be dangerous?—There are places that we know are dangerous, but these places are examined when we think there is any sign of anything falling.

2515. And are they inspected by means of ladders?—Yes. There are two men at the quarry who do nothing else but that, and sometimes there are as many as six men attending to that work. I have myself seen as many as six at a time.

2516. What about the paths; do they all go through safe places?—As far as I am aware, they do. I have

never seen any sign of danger in the paths at all, that is to say, danger overhead, as you walk along the paths. Perhaps it is possible to improve the paths themselves in some places, and there are some men engaged on work of that kind at the present time.

2517. Are some of the paths suspected of being dangerous?—There is only one path at the quarry to go down to the works, and I have never seen any sign of danger overhead, nor have I ever heard anyone else complain of any danger.

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2518. And it is a good path in every respect?—It might possibly be improved a little.

2519. But you do not consider it dangerous?—No, I do not.

FIFTH DAY.

At the Cocoa Rooms, Blaenau Festiniog, 16th January 1894

PRESENT:

DR. C. LE NEVE FOSTER in the Chair.

MR. E. PARRY JONES, J.P.
MR. J. J. EVANS, F.G.S.
MR. JOHN JENKINS.

Mr. JOHN JONES examined by the Chairman.

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2520. (*Chairman.*) Where do you live?—At Morfa Bychan.

2521. And you are a rockman, I believe?—I have been a rockman.

2522. How many years were you employed as a rockman?—From 10 to 12 years.

2523. And are you working as a rockman at the present time?—Yes, in open quarries, raising building stones.

2524. When did you give up working at the underground quarries?—It will be three years next February.

2525. Then until four years ago you were working as a rockman at underground quarries?—Yes; I was.

2526. In this district?—Yes.

2527. At what quarry?—At the Cwmorthin Quarry.

2528. What have you to suggest to us?—I should like to refer to the underground dangers, and to the mode of working there.

2529. Then will you give us your suggestions?—I should like, first of all, to speak about the pillars, and to say how they are worked, or at all events how they were worked at the time I was there. In some cases, when there is workable slate in the pillars, the pillars are cut down after the chamber has been worked. I have been doing that myself, and I consider that that endangers the chambers which follow. On one occasion I was pulling down a pillar myself in 1890 under Mr. Owen's directions, and in one part it was not more than four yards wide.

2530. What was the original width of that pillar to which you refer?—Perhaps it was from 8 to 10 or 12 yards, or something like that. I should also like to refer to the working of the inclines where it was carried on during the time I was at the quarry. There were no paths for the men to go to their work to two places underground except along the incline.

2531. What distance had the men to go?—There were four floors in one of the places I am speaking of, and three, I think, in the other. In one of them there was only one floor to descend without a proper path. The men were under the necessity of walking along the incline while it was working, and I consider that a very dangerous practice.

2532. Was the incline stopped at any time during the day for the men to go up and down?—I am not aware that it was stopped except at mid-day, that is, at meal time.

2533. Have you anything else to say?—I should like to refer to the tools that are used at the quarries,—the tampers and the hoops for re-charging.

2534. What do you mean by a "hoop"?—It is a gutter like a pipe cut across lengthwise.

2535. (*Mr. Evans.*) A curved hoop?—Yes; it is made of iron. We used iron tampers there, and iron hoops. I worked the whole of one chamber and part of another, and I used nothing but iron ones.

2536. (*Chairman.*) Did you use the iron tamper for putting in the first part of the tamping, or what?—Yes; altogether.

2537. And do you know that that is illegal?—It was said so, I believe; but I do not know that I have taken that much notice of the rule. On one occasion an application was made to the old management for copper tools. That was at the time that the Truck Act came into operation. I did not see any of them being supplied, although the company at the time supplied the men with all the tools they required for carrying on their work.

2538. Have you anything else to say?—Yes; there is the question of the Government inspection of mines. I consider that it is very imperfect as it is at present carried on, because information is given in some way or other of the intended visits of the inspector to the quarries, so that the men have time to remove their candles from the chest, and put things in order before the inspector gets there. I do not know how it is, but they get notice of the inspector's visits in some way or other. We also consider that his visits are not frequent enough, owing to his district being too extensive. Somehow or other, the information leaked out as to when he proposed to visit the quarry, so that everything was put in proper order for his visits.

2539. (*Mr. Jones.*) What did you mean by the words "*hen oruchwyliaeth*," which were translated "old management"?—I meant the old management of the Cwmorthin Quarry.

2540. And is that kind of thing carried on now under the present management?—It was carried on under the present management during the time that I worked under it for about two years.

2541. And up to the time you left the quarry?—Yes up to the time that I was dismissed in February 1891.

2542. (*Chairman.*) All that you have been telling us refers to a period four years ago?—Yes, I give that evidence from my own knowledge and experience, but I am told that the same thing is carried on there still, and that the pillars are cut below their proper width.

2543. Have you anything else to say?—I should like to call attention to the necessity for a periodical inspection of places, and I would suggest that that should be done by other persons than the officials of the quarry. With regard to the giving of evidence, I believe that in many instances they are so much afraid of the management that they will not come forward to give evidence.

2544. To give evidence where?—In legal proceedings when there is anything between any of the workmen and the company, or anything of that kind. The men are revenged upon afterwards.

2545. (*Mr. Jenkins.*) Does that refer to inquests?—I believe it does to a very great extent.

2546. (*Chairman.*) In what way do you mean that revenge is shown to the men afterwards?—It lays them open to disadvantages in connexion with their work,

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and in one instance men were dismissed from the quarry without any proper reason being given for that.

2547. Was that for giving evidence at an inquest?—I cannot say as to that, but I can say as to other matters.

2548. Then was it for giving evidence in any prosecution of the company?—Yes, and if that is doubted at all, I think I can prove it from what passed between Mr. Owen and Mr. Robarts in a certain matter.

2549. Had that anything to do with the safety of the workings?—Of course a man's daily bread was in the question.

2550. But had this anything to do with the safety of the persons employed in the quarry, or any of them; did it affect their health or life or limb in any way?—I believe it did, for the reason that the truth is not fully and fairly told as to the state of the things in the quarry.

2551. Do you want to say anything more?—If I am allowed to make suggestions which will tend towards the safety of the men in future I can make them.

2552. Certainly; we shall be very glad to hear them. —With regard to the inclines, a man from the pit has often, in the performance of his duty, to go along the incline to the smithy or to some other place, and I consider that there ought to be some arrangement made as to that, and that the incline should be stopped from working when the men are walking along.

2553. Would it not be better to have a separate path from the incline altogether?—Yes, that would certainly be better, but perhaps it would be more expensive to the owners, whilst the other plan can be carried out at small expense. It would not be much to stop the incline from working for a short time while the man is on it. On one occasion I saw an arrangement by which the man at the top might communicate with the man at the bottom, and in that way the machinery could be stopped when there was anyone on the incline.

2554. Are you aware that the men are forbidden at Cwmorthin to walk on the incline while the traffic is going on?—I believe there was something of the kind at one time about seven years ago, but it could not possibly be carried out and the men broke the rule. The men are under the necessity of going up and down the incline, in consequence of the conditions under which they carry on their work. One incline there is being used for three purposes, or at any rate that was the case when I was working there.

2555. What do you mean by "three purposes"?—It was used for raising whatever was required from the underground workings to the surface, such as rubbish and blocks of slate, &c., and as a path for the men to walk along and for pumping from the incline. The pumping was carried on at that time while the men were going to their work, and the moment the pumping was stopped the incline commenced working. Steam used to escape at that time, and the incline was so full of steam that a man could not see a yard in advance of him.

2556. Is that the case now?—I cannot say for certain whether it is so now or not, but I know that a fatal accident occurred to Samuel Evans on the incline that I am referring to, after I was dismissed from the quarry. When the trucks are coming down the workmen try to jump into them, and thus break the rules of the quarry.

2557. Then you suggest that there should either be a cessation of traffic while men are going up and down, or that there should be separate paths provided?—Yes.

2558. What is the next suggestion you have to make? —There were no manholes when I was there, but where they do exist I do not think they answer any purpose whatever. I consider they are a complete failure.

2559. Have you anything else to say?—No, nothing else. I should like to say that if my evidence as to the cutting of the pillars is doubted I am willing to go to the quarry with any of the members of the Committee to prove what I have said on that point.

2560. (*Mr. Jones.*) What time of the day does the engine stop working there—I mean before 12 o'clock?—I do not know that it stops at all after it commences working until 12 o'clock.

2561. Not until 12 o'clock?—That was the rule of the quarry at the time. They were to work until 12 o'clock.

2562. But at what time does the traffic stop on the incline?—At 12 o'clock.

2563. And at what time do the men come up from underground?—A great many of them do not come up until 5.30, or that was the case at the time I worked there.

2564. But those that do come up at mid-day, what time do they come?—Some time between 11.30 and 12.

2565. So that the traffic and the men are actually on the incline at the same time?—Yes, and many of them take advantage of the traffic and come up with it.

2566. What do you mean by that?—The men used to go up on the trucks, and on the rope when it was going up.

2567. What time does the incline stop working in the evening?—From 5.0 to 5.30.

2568. And is that the same time as the men leave off work?—Yes, some men leave off work at that time, but they differ. Some of them have to go and carry the manufactured slates.

2569. (*Mr. Evans.*) I do not know whether I understood you very clearly as to the cutting of the pillars. Were you allowed by the agents to cut the pillars in the way you have described, or were you taking advantage, and trying to get good blocks yourself without their permission?—Of course we had to get the permission of the agent before we had the right to do it.

2570. Then you were directed to do it by the agents? —Yes, of course we were.

2571. And are the pillars generally cut down in that way?—I believe I can mention one floor in particular, where there are only three or four pillars that have not been cut down in part.

2572. And that by orders of the agent?—Yes, certainly.

2573. Do the men sometimes take upon themselves to cut the pillars without the permission of the agent?—I am not aware that that is done. I daresay the men show the agents that there are no slates in the chamber and then it is easier to get permission.

2574. What suggestion can you make to the Committee with the view of preventing the men from breaking the rules of the quarry?—To carry out the law in regard to those who violate the rules.

2575. You mean that the men should be prosecuted? —Yes, certainly, if the company are free from blame themselves.

2576. Assuming that the company are sinners, do you think that would justify them in not prosecuting the men?—No; I consider that in case the company ought to be prosecuted as well as the men.

2577. Is there anything on the incline you have referred to which is dangerous to the men besides the steam, when the engines are pumping?—Of course the incline is dangerous in itself, if it is working at the time.

2578. What is the danger?—There is danger of a rope breaking.

2579. What is the danger when the pumps are working; are they worked by rods, or how?—Steam escapes from the pipes and fills the incline, and as candles are the only means of lighting, they are affected by the steam, and give no light whatever.

2580. And the men are left in darkness?—Yes, because they do not get the light they ought to get from the candles.

2581. What sort of a path have you to go down the incline?—We had to go down the incline itself, either between the rails or along the side. There were no steps at all at that time.

2582. The same gradient as the incline?—Yes.

2583. (*Mr. Jones.*) Can you give us the numbers of the floors that you are complaining of, or the numbers of the pillars?—It is in floor B., south sink. I cannot give you the numbers of the pillars.

2584. And how many pillars are there that you complain of?—I do not believe that there are more than three or four pillars that have not been cut down in part. I have been cutting two of them myself.

2585. I think you made a statement just now to the effect that the pillars were cut down after working the chamber home, is that what you mean?—Yes, after working that particular floor, that is, when one chamber has been worked on one floor, and not when all the chambers have been worked.

2586. Then the pillars are taken down before the other chambers are worked?—They are cut down in part, for instance, if a pillar is 10 yards wide, possibly 3 or 4 yards might be taken from it.

2587. When did that take place?—It took place when I was working there up to three years ago, and I believe it is done there now.

2588. You say it was done up to three years ago?—Yes, and as far as I have been told it is carried on there now, in one place at all events. I refer to a place which was cut in part before I was dismissed.

2589. I suppose you use steam pumps there?—Yes, it was steam that was used then, steam from the engine.

2590. Steam conveyed by pipes to work a pump underground?—Yes.

2591. (*Mr. Evans.*) I notice in the table prepared by Dr. Foster that there have been several accidents in the New Welsh Slate Quarry during the last 10 years. Can you refer to any accidents that have taken place at that quarry, owing to the mismanagement that you have alluded to?—I believe I can refer to one in particular. It took place after I was dismissed.

2592. Do you know the history of that case, although you were not present when the accident happened?—Yes, and for this reason, I was present in court at Penrhyndeudraeth when Dr. Foster prosecuted the company. The case was dismissed, but I understand from one of the relatives of the deceased that they received compensation afterwards from some source or other.

2593. Can you tell us what accident that was?—It was the case of David Jones, Llanrwst, and William Ellis.

2594. (*Chairman.*) Is that the accident that took place in February 1892?—I cannot give the date, but I believe it was on the Thursday before Easter two years ago.

2595. In the returns, the date is given as the 5th February, 1892, David Jones and William Ellis, both rockmen, one aged 42 and the other 27, and they were killed by a fall of rock from the roof of the chamber in which they were working?—Yes, that is the case.

2596. (*Mr. Evans.*) Do you agree with the statement there given as to the cause of the accident?—Yes, I do. The pillars of the chambers on floors above were cut down about 9 or 10 years ago so that there was no proper support.

2597. (*Chairman.*) Were you in the quarry at the time?—No, I had been dismissed before that.

2598. (*Mr. Evans.*) Do you know the place from your own knowledge?—Yes, I worked there for some time, in that very chamber. I worked there at night.

2599. And you believe that the cause of that accident was the widening of the chamber by cutting the pillars on both sides?—There is reason to believe that that made it wider and weaker.

2600. But you cannot say from your own knowledge that that was the cause?—I will say this, that that was not a safe chamber to work in while I was working there at night. Small pieces of rock used to fall down even then.

2601. (*Mr. Jones.*) Was that before or after the pillars were cut down or thinned?—It was after cutting them down that the accident happened.

2602. But when you were working there at night, and you noticed small pieces of rock falling down, was that before the pillars were cut or afterwards?—That was also after cutting the pillars.

2603. Can you tell us the time that those pillars were cut down, how long ago it was?—I believe it was about eight years ago, or more.

2604. When were you working there at night, in what year?—It was at the end of the year that Mr. Owen came there as manager—1889.

2605. And how long was that before the fall took place, and the two men were killed?—It was about two years before that, but there had been a previous fall in that chamber five or six years ago, and no inspection was made of the place up to the time I was dismissed, nor up to the date of the fatal accident as stated on oath.

2606. How far is that chamber from the large fall that you had at your quarry?—Two floors.

2607. Does this large fall affect the chambers down below at all?—I believe that as the mine gets deeper it becomes more dangerous, owing to the weight above.

2608. (*Mr. Evans.*) I see that the accidents are heavier in the New Welsh Slate Quarry than in the other quarries. Can you tell us whether that arises from natural causes in the rock, or from the management of the quarry in some way?—That accident happened owing to the nature of the ground to a certain extent.

2609. And to what else do you attribute it?—As permission is given to cut down the pillars, that becomes a question of the management of the quarry. That is how I look at it.

2610. I understand that a great many of the accidents which are put down as occurring from falls of ground are caused by small pieces of rock slipping from the working places; is that so, to your knowledge?—I am only aware of one or two accidents of that kind which have happened within my memory.

2611. Then according to your experience it is not small pieces of rock falling from the face of the rock that is the cause of most of these accidents?—No. I believe that the majority of them happen from falls from pillars and from the roof.

2612. (*Mr. Jenkins.*) How long have you worked as a rockman?—From 10 to 12 years.

2613. And did you work during the whole of that time in the New Welsh Slate Quarry?—I have only worked for three months in any other quarry.

2614. Therefore you know the quarry thoroughly?—Yes, I know the greater part of it.

2615. Do you know that there are natural causes in that quarry which bring about accidents, more than is the case in the other quarries?—Yes, there are.

2616. Can you say what they are?—The ground is more loose and there are "bevels" in the pillars.

2617. And should there be more care exercised in working the quarry on that account?—Yes, certainly, especially in the working of the pillars. The pillars have "bevels" in them, and when they are cut down narrow there is greater danger. I consider they should be left wider.

2618. You have stated that you yourself have been cutting down these pillars?—Yes, I have.

2619. Do you mean that the officials set bargains in the pillars for the men to deliberately cut the pillars?—Yes, certainly.

2620. And that is done for the sake of getting slates?—Yes, of course.

2621. How do you explain that; can you give any other reason for the practice beyond the fact that they do it for the purpose of getting slates?—Parties of men in the quarry get out of employment. They have no slate in their chambers. That is one reason. Men also prefer to have the side of a pillar to work in rather than work by the day in the quarry.

2622. Is there anything that you know of that would forbid their doing so?—I am afraid I do not quite understand the question.

2623. You consider the practice you have referred to to be a source of danger?—Yes.

2624. Do you know that there is any provision in the law or anything of that kind to prevent them from doing that?—I have not seen or heard that there is anything of the kind, at any rate it is allowed by the management.

2625. If there is nothing that forbids that kind of thing at the present time, do you think there should be?—Yes, I believe there should be for the sake of the safety of the men.

2626. Are they allowed to do that in all the quarries?—That is more than I can say. As I said at the commencement, I have only worked three months at a slate quarry other than the Cwmorthin, and I cannot therefore say anything about any other quarry.

2627. Is the Cwmorthin Quarry worked systematically?—I believe it might be improved upon. In some cases I have noticed that when a chamber has been worked, the chamber which follows on a floor below opens in the middle of the pillar above, so that it is necessary to cut a *bôn* in it.

2628. (*Mr. Jones.*) To cut a *bôn* on the side of the pillar?—Yes.

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2629. (*Mr. Jenkins.*) That is to say, proper care is not taken to open the chambers in a line?—That is a matter for the Committee to judge, I am simply stating facts as they are.

2630. You say that chambers are opened under a pillar, and where a pillar should be?—I do not say that it is opened below the pillar, but it comes to the middle of the pillar.

2631. And is that a source of weakness in your opinion?—Of course it weakens the pillar.

2632. What is the width of the chambers and the pillars generally?—I believe they vary, according to the nature and quality of the rock.

2633. What do you mean by the quality of the rock, do you mean a good slate and a bad slate, or what?—Yes, good rock and bad rock, as we call them in the quarry.

2634. If the rock is a good one, the chamber would be wider and the pillar narrower?—No, I do not think that the pillar would be narrower, but the chamber is allowed to be cut wider when the rock is good. The pillar is cut down generally after the chamber has been worked.

2635. Is there any kind of inspection carried out at that quarry?—There is some kind of an inspection when complaint is made by some of the men. That was the case when I was there.

2636. In what way was there an inspection made?—When complaint is made by some of the men that they consider a certain place dangerous a gipsy lamp is used to examine the place, and naphtha or some other oil is used to light them. If anything can be seen by the naked eye to indicate that there is any danger above some men are set to examine it.

2637. And that is done by the aid of that light?—They use lamps when they examine it by means of a ladder, but first of all, after a complaint has been made, they pour oil on the rock, or on some convenient spot, and set fire to that, and examine the place by the aid of the light produced in that way.

2638. And if nothing can be seen from the bottom are we to understand that no ladder is raised?—As far as my memory serves me I have not seen a ladder raised unless there was something dangerous to be seen.

2639. Unless there was something dangerous to be seen from the bottom?—Yes, certainly, from the most convenient place at the bottom.

2640. Have you any suggestion to make to the Committee with the view to remedying this state of things?—I believe there should be a periodical inspection of these places by an inspector under Government, rather than by a man under the Company.

2641. Do you mean that the Government inspector should raise ladders?—I believe he ought to be able to do that, and if not, he is not able to do his work properly. How can he prepare a report on the nature of a place unless he can inspect it properly?

2642. And how often would you make these periodical inspections?—I do not consider it is necessary to raise a ladder every time, but a proper light should be used in order that the place may be seen properly. That is what I mean.

2643. We have had a suggestion to the effect that there should be an inspection of every "thickness" before it gets out of reach, what is your opinion as to that?—I believe it would be a very good thing. Owing to the natural joints and things in the "rock," it "scribes" in time under the weight, and becomes dangerous.

2644. To whom would you entrust that duty?—I believe it is a duty that should be enforced as against the workman, and that the manager should be there also to receive the report of the man. At the same time, I do not say that in the great majority of cases there is not sufficient care taken in this respect, but I fear that there are instances where it is not properly seen to. It is possible that there may be too many men working outside, and too few underground to provide slate for them, so that the latter have too much to do, and cannot find time for that kind of work, notwithstanding its importance as regards the safety of the men.

2645. What is your experience of the men, do you think they are apt to neglect their duty in that respect?—They are driven to neglect it as a matter of necessity, seeing that there are a large number of men in the mills who depend upon them for slates.

2646. That is to say, they have not sufficient time to do the work properly?—Yes, that is it.

2647. And they do not want to lose money by it?—The great object of course is to make wages.

2648. Would you approve of the owners appointing a man to inspect every "thickness," on their own responsibility, before it gets out of the reach of the workmen?—Yes, I would.

2649. Did you know, when you were working under the New Welsh Slate Company, that places were worked there which the management knew to be dangerous?—Yes, I think I know of one instance.

2650. Is it a fact, if a man knew that he worked in a dangerous place, he would always tell the manager that it is so?—No, I do not believe they would do so.

2651. Do you believe that men would risk their lives by working in such places?—Possibly a man might be content to do so, and console himself with the idea that the rock, although dangerous, would not fall down.

2652. Have you seen men go to work to places no matter how dangerous they were?—I know of one case where a man refused to go to work to a place which was dangerous, and another man went there to work instead of him.

2653. Have you seen many rubbishers go underground to try to get a load of stones?—No, they are not so common at Cwmorthin, or they were not in my time.

2654. Can you give us instances of unwillingness on the part of the management of the quarry to inspect a place reported to them as not being safe enough for the men to work in?—I can refer to one instance in my own case. I cannot say that there was any unwillingness, or that the agent refused to inspect the place, but he complained that too much time would be taken up with the inspection, and I was told to give up my bargain.

2655. Was that tantamount to a refusal to make the place safe?—I will tell you what the manager's words were. We had been engaged at the place pulling down dangerous rock for a long time. I think we were there for five weeks. The two men whom he had specially for that kind of work were there with me. Every authority had been put in the hands of those men as to making the place safe, so that the responsibility of being engaged with the work for a long or short period had been taken off my shoulders as a bargain-taker. On the first Monday in the quarry month I was told that I was to go up to work during the day, and not at night as formerly. I was not told officially, but it was a suggestion, and I made inquiries into the case, and I was requested to go up on the Tuesday morning. I did so, and a charge was made against me that I had refused to work during the day. I told the manager, Mr. Robert Owen, that I should work neither by day nor by night until the place was rendered safe. I was then ordered to go in and fetch my partner, that he might get men to work the bargain. I did so, but by the time I got back the management had been altered. One of the men who worked with me was put to work with my partner at night, and two others were put there to work during the day, so as to make the place safe. In consequence of that arrangement I had to stay home for five days, and during that time I had nothing to do. I cannot say that it was done by way of revenge because I refused to work there, but the fact remains that I got nothing to do, and that I could not get anything to do although I applied for work.

2656. Had the other men something to do?—Yes. The two men who were working with me on the dangerous rock, as well as my partner, were allowed to do other work. They were put to fix a bridge or something in another part of the quarry, but I could get no work to do.

2657. Was the place stopped altogether?—No, it was only stopped for that week. It was made secure after that.

2658. Is the Cwmorthin Quarry a wet quarry—is there much water there?—The fact that they have to keep pumps working there shows that there is much water there.

2659. And does the water run along the face of the rock?—Yes, in some cases it does.

2660. Is that the case very often?—On the eastern side of the quarry, where I worked there was a good

deal of water, which I believe was due to the fall. The mountain had cracked above. That could be proved, because when it rained very heavily there was water underground just the same as on the surface and it flowed along the levels.

2661. And is that, in your opinion, a source of great risk to the health of the workmen?—Yes, undoubtedly it is. For a man to be wet and in a draught at the quarry is certainly dangerous to health.

2662. Have you seen men get very wet in working on the rock?—Yes, and I have been very wet myself.

2663. How do they get wet, can you describe it?—They get wet because they have to work on the rock. The water flows along the rock and along the chain, and as everyone who is acquainted with the rockman's work knows, he has often to kneel down or to lay on his side to cut some rock down.

2664. Could that flow of water be prevented in any way, do you think?—I believe it can be, in part at any rate.

2665. By what means, how would you prevent it?—By opening up the places that have been closed.

2666. If that water could be prevented without going to any very great expense, would any benefit be derived therefrom?—Yes, it would reduce the cost of fire and coal to pump it up. Where the water trickles down along the face of the rock, where we cannot put in a second charge, we must have some means of pulling down the rock, and it loses in value in consequence.

2667. Are the men compelled in cases of that kind to use more powder than would otherwise be necessary?—Yes, they are obliged to put more powder than is needed, because they have to re-charge, and sometimes the powder does not take effect afterwards, and they have to use for blasting what is not suitable for blasting slate rock.

2668. And they also have to expend more labour on the work?—Yes, of course.

2669. (*Mr. Jones.*) Do you mean to suggest that proper care is not taken to drain the works, say from the level of the lake, which is the natural drainage of the quarry?—Do you say that proper care to drain the works above that level is not taken?—Owing to the drain along which the water had to go to this level being blocked up, I remember seeing the water unable to pass along, and if I had been obliged to pass that way I should have had to wade through very deep water, perhaps to the middle of my body.

2670. With regard to draining the works below that level, how do you suggest that it could be done?—That is the level which has to convey the water out, and whether it comes from below or from above, it has to pass out through that level.

2671. That is the natural drainage of the quarry?—Yes.

2672. How do you suggest that the pumping of the quarry should be carried on?—In the ordinary way of pumping.

2673. But if that is your suggestion, what is it that you complain of?—We complain of what comes down from above that place. I am referring to a place called Number 1, south sink. It is where the sink begins to descend.

2674. (*Mr. Jenkins.*) Would you recommend making dams at the top of every bargain for the water to run along?—I doubt very much whether it would be safe, and I do not think it would be of much use, unless something were done to prevent its coming into the rock again, because where a bargain has been worked the rock gets loose, and the water would come in.

2675. Do they not make dams along the tops of the sinks?—I have not seen any.

2676. You have never seen a dam made across a chamber?—I saw them attempt that in one place, but it was a failure. It did not answer the purpose and the water came through all the same.

2677. What is your opinion of quarry agents, are they, as a rule, capable of making inspections?—I cannot say anything with regard to agents in general. I can only speak of the agents with whom I have been working, and as to those, they are as incapable as a child three years old. I saw plenty of opportunities for them to do it if they wished to do it, but I never saw any of them do it except Mr. Andreas Roberts. I saw him climb up a ladder on one occasion.

2678. Are all the agents not practical quarrymen?—Do you mean underground or above-ground men?

2679. I include both classes?—As far as my knowledge goes not one of them is an experienced rockman, at any rate.

2680. And do you think that they ought to be experienced rockmen?—That would be an additional qualification. It would certainly be desirable that they should be able to do the work themselves, rather than entrust it to anybody else.

2681. As a rule from which class are the agents taken?—Mr. Robert Owen was manager of the Old Welsh Slate Company and Mr. Humphrey Roberts was slate inspector. I do not know what Mr. Eames was.

2682. I do not want you to specify any names. Can you tell us from what class the officials are taken, speaking generally?—They are promoted from one post to another, as far as I know.

2683. You have stated in your evidence that you know instances of revenge for giving evidence in legal proceedings, but you could not point out a case where that had been done in the case of evidence given at an inquest. If revenge is shown at all, would it, in your opinion, have the effect of preventing men from coming forward to give evidence at inquests?—Yes, I thoroughly believe that it would. It comes to exactly the same thing whether the revenge is shown as the result of evidence given at an inquest, or at a prosecution. The men are afraid to come forward to give evidence which may be considered unfavourable to the company.

2684. Do you believe that men are unwilling to come forward to give evidence at inquests as well as at prosecutions?—I believe that they would prefer not to give evidence.

2685. (*Mr. Jones.*) What do you mean by that answer—do you speak of the men generally, or are you only referring to two or three isolated instances of men who were afraid or unwilling to come forward to give truthful evidence at inquests, or in legal proceedings generally?—Yes, I do; without being summoned.

2686. Is that a general thing amongst them, or an exceptional thing?—The occasions for giving evidence are not general, so that the cases of unwillingness are not general.

2687. Is there invariably a difficulty in getting witnesses among the quarrymen, and an unwillingness on the part of the men to give evidence when the occasions do arise?—Yes.

2688. And is that the general rule?—Yes; it is.

2689. You have referred to an inspector, and you said you wanted him to inspect the "thickness"?—Yes.

2690. Do you know of any accident that has happened in consequence of the want of an inspection of that kind?—Yes?—I can refer to one.

2691. What accident was that?—The case of John Hughes, Tre'rddol. I believe he is alive now. It was owing to a fall. A "thickness" above came down when they had removed the "thickness" below, and it fell on his leg and injured it.

2692. So that the only accident you know of was an injury to his leg?—Yes.

2693. It was not a fatal accident?—No.

2694. You ask for an inspector for that kind of work, and you leave the most dangerous part of the work without calling for an inspector to see to it,—how do you account for that?—I believe an inspector ought to be appointed to take in hand all that kind of work. I do not mean to define or limit his work. I simply mentioned that as one thing I would like him to attend to; but there are many other things as well.

2695. What do you mean by an inspector,—a man with a gang of men there to raise ladders and so on, or what do you mean?—A man in the neighbourhood of the quarries appointed by the Government to do that work, and nobody else.

2696. You want this inspector to take charge of the quarries, say in Festiniog?—I consider he ought to take charge, as far as the safety of the men is concerned.

2697. Do you know that the Cwmorthin Quarry is a freehold property?—I ought to know that, as I have a share in it.

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2698. But there are quarries in which there are shareholders which are not freehold?—Mr. Robarts taught us enough at the time he offered the shares to us about the quarry being freehold.

2699. Do you think that the fact that Cwmorthin is a freehold property has any bearing at all on the working of the quarry?—No; I do not think it has. If that had anything to do with the method of working the quarry it would have been carried out more perfectly.

2700. You say you do not know anything at all about other quarries?—No; I do not.

2701. (*Mr. Evans.*) Do you not think that in the case of a freehold the quarry owners are more at liberty to do as they wish with it than would be the case with a leasehold quarry?—I cannot say what the terms of the quarry leases are.

2702. But you naturally think that there are terms?—I cannot say; I have never seen a quarry lease.

2703. To what period do you refer when you say that some chambers were cut under the pillars, so as to necessitate the cutting of a *bôn*—do you refer to the present management or to the late management?—I have given evidence on those points with regard to things that I can prove myself.

2704. But to what period do you refer; how long ago did that take place?—I refer to the time when I worked there.

2705. And up to the time when you left the quarry, four years ago?—Yes.

2706. But to what time did you refer just now when you stated that they were cut in that way?—To the time I was working there and was dismissed.

2707. When were the miners working there?—Before they began to work the chamber as a chamber.

2708. But how long was that ago, was it four or eight or 10 years, or how long?—Perhaps it is four years ago, the instance I can refer to.

2709. Can you refer to any instances after that?—No, I cannot. Those chambers were being worked at the time I left the quarry.

2710. Do you think that engineering in the quarries has improved during the time you have been connected with them?—I do not know indeed.

2711. Do you consider that a chamber may be cut wider where there is good solid rock, than where there is poor and brittle rock?—Yes, certainly.

2712. And the pillars could be left narrower in those cases?—No, I do not think they should. The pillars ought to be equal in width to the chambers.

2713. Do you not think that a pillar of solid rock is stronger than a pillar of loose stuff?—That is so, no doubt, but a narrower chamber in loose, poor rock would add to the strength of the pillar. The chamber would be narrower as well as the pillar.

2714. Do you know of your own knowledge whether the men at Cwmorthin are afaid or not to attend to give evidence before this Committee?—It appears they have gained courage, as I see there are a lot of them here to-day.

2715. Have they been afraid?—I cannot say.

2716. But you have just said that they have gained courage, and that rather implies that they were at one time afraid?—I cannot say anything about that; you can ascertain from them on whose behalf they are here.

2717. Did anyone ask you to come here to give evidence?—No.

2718. Then you have come here of your own free will?—I have come here through an understanding with a number of friends in the neighbourhood to give evidence, but not owing to any request which has been made to me.

2719. Do you wish us to understand that you represent anybody besides yourself?—No, I do not represent anyone but myself as regards giving evidence. I simply desire the welfare of the men.

2720. Did you consult any friends here before coming here to give evidence?—No, I did not.

2721. (*Mr. Jenkins.*) You said just now that the manholes along the incline are a complete failure?—Yes, they are.

2722 Have you any reason for that?—Yes, it is because they are underground inclines. The light is very imperfect there. If a man happens to be very near a manhole when it is wanted, it is useful enough; but if an accident occurs when a truck is going up or down, the manholes are too inconvenient for a man to be able to run to them. The trucks come down very quickly, and no sound is heard until they are close by, so that there is no time for the men to run to the manhole.

2723. Then the only remedy, according to your views, is to have a separate path for the men to walk along, so that they need not have to use the incline for the purpose?—Yes. Perhaps it could be remedied if the men were able to communicate with each other, so as to stop the traffic, in the same way as the man at the bottom is able to speak to the man at the top, at the present time.

2724. (*Mr. Jones.*) Or a time-table for the running of the traffic could be arranged?—Yes, that could be done.

2725. (*Mr. Jenkins.*) Do the New Welsh Slate Company work under any special rules, or under the Act only?—I believe the quarry is under special rules.

2726. (*Chairman.*) Have you ever read the special rules which are in force there?—No, I have not read them once over.

2727. Are you aware that you have to obey the special rules?—I know it to some extent, through hearing them talk in the quarry.

2728. Are you aware that some of the matters you have spoken of are provided for by the special rules?—No, I am not. It is quite impossible for me to say, as I have never read them.

2729. Can you read?—Yes, I can read Welsh.

2730. And are not the special rules posted up in Welsh at the quarry?—I cannot say. I never paid much attention to them in that way.

2731. You say that a proper light should be provided for making inspection of the roofs and pillars?—Yes.

2732. What do you mean by a proper light?—I do not object to the light they use at present, but it is only of short duration. I want a good light to be thrown on the place which is considered to be dangerous, so that it can be properly seen, instead of trusting to what can be seen by the naked eye from below.

2733. Would you be satisfied with the Wells light?—I do not know anything about that.

2734. You have never seen the Wells light?—No, I have not.

2735. You spoke of a pillar which had been thinned down to 4 yards, can you name the floor and chamber where that pillar is?—Yes, I can name the floor.

2736. Where is it?—It is floor B., south sink.

2737. That is the same as the other one you spoke of?—Yes, that is what I was referring to.

2738 You spoke about men getting wet at the quarry; do you think the men would like to change their working clothes at the quarry, and leave them there, and go home in another suit of clothes?—My own feeling in the matter is that I should like it, the same as is the case in other works I have been in, where a man sees to the drying of the men's clothes, and that they are properly dry by the following day.

2739. You referred to a case where the water would be up to your middle if you went there, and had to walk through it, was that when the pump had broken?—There was no necessity for the pump in that case after the level was opened for the water to run through it. The rubbish had come from another floor and blocked up the level.

2740. (*Mr. Jones.*) They were tipping from another floor?—Yes.

2741. (*Chairman.*) Were you the plaintiff lately in a case against the Cwmorthin Company?—Yes.

2742. And did you lose your case?—Yes.

2743. (*Mr. Evans.*) Can you tell us what was the cause of your leaving the Cwmorthin Quarry?—I took part in the legal proceedings which John Rowlands instituted against the company.

2744. And were you turned away in consequence?—We were turned away in the February after the case occurred.

2745. And you have reason to believe that you were dismissed in consequence of that?—If the Committee

like to spend two hours in going through the communications which passed between Mr. Owen and Mr. Robarts in reference to the matter, which I hold in my hand, they will find that it was the case.

2746. That would be too much for the Committee to undertake; what is the impression on your mind?—It is not too much time to spend in order to get at the truth. The correspondence which I have in my hand shows that on the 30th January Mr. Robert Owen wrote to Mr. Robarts that he had no fault to find with us, or anything against us, and that he could not dismiss us without there being a case against us, otherwise we would appeal to the Quarrymen's Union and be looked upon as martyrs. This letter was written on the 30th January and on the 21st February we were dismissed.

2747. (*Chairman.*) Was not that matter brought before the judge who tried the action?—Which matter?

2748. The matter between you and the management as to your dismissal?—Yes, the decision of the County-court judge was against us.

2749. Was this case connected with life and limb, or was it some other dispute between you and the manager?—The matter started with a dispute as to a contract.

2750. (*Mr. Jenkins.*) You brought an action against Mr. Robarts for libel?—Yes.

2751. And your contention was that you had been turned away and revenged upon for the part you took in the action brought against the company by John Rowlands?—Yes, our case was that the management took revenge upon us for taking part in that case. Four of us asked Mr. Robert Owen what his reasons were for dismissing us, but he refused to give any. Mr. Robarts was then written to and he refused to give anything but negative reasons.

2752. Would it be right to say that you left the quarry of your own accord?—I say I was dismissed.

2753. Do you know that Mr. Robarts said, in the course of his evidence before the Royal Commission on Labour, that you left the quarry?—Yes, I believe he said that. What Mr. Robert Owen told me was, that my connexion with the company was at an end that day.

2754. You say the men do not come out to dinner at the New Welsh Slate Quarry; for how many hours do they work underground per day?—There are many who do not come up, but those who live in the barracks do come.

2755. But those who do not come up in the dinner-hour, for how many hours per day are they underground?—They are bound, according to the rules of the quarry, from the time the bell rings in the morning until it rings again in the evening, that is, from 7.0 to 5.30.

2756. That would be 10½ hours?—Yes.

2757. And is that too much, in your opinion?—Yes, I believe it is. I consider that eight hours is quite enough for any man underground.

2758. Do you believe that it affects their health to be underground for so many hours?—They are in an impure atmosphere, at any rate.

2759. Are there any privy arrangements in the New Welsh Slate Quarry?—I never saw any there, except one that belonged to the agent's house.

MR. DAVID JONES examined.

Mr. D. Jones.

2760. (*Chairman.*) Where do you live?—At Penrhyndeudraeth.

2761. And you work at the Votty and Bowydd Quarry?—Yes.

2762. What is your occupation?—A slate dresser.

2763. And how long have you worked as a slate dresser?—For about 20 years.

2764. Have you worked the whole of that time above-ground?—Yes, nearly the whole of the time, but occasionally I have worked underground.

2765. What suggestions do you wish to make to us?—Although I have had a little experience underground it is imperfect, and I should not like to give evidence with regard to the underground workings I consider we have not much to complain of in the mills, because there have been improvements of late, but there are a few things that we would like to have attended to. I should not like to confine my evidence to any quarry in particular.

2766. And what are those things?—There is the question of draughts, and dust, and so on. Perhaps a little improvement might be made in those matters.

2767. In what way do you mean?—The mills ought to be made free from draught, as there is greater danger from draught, in my opinion, than from dust.

2768. Have you anything else to say?—With regard to the dust, I accept the medical evidence that has already been given.

2769. You say that draughts ought to be stopped; have you any suggestion to make as to that?—I believe that the mills can be made into very good buildings, and that this will be done by and bye, and that draughts will be excluded altogether.

2770. Have you anything else to say?—In consequence of the tendency that men have of interfering with machinery, I think that proper supervision should be kept, so that they might not interfere with them at all.

2771. What do you mean by "interfering with the machinery"?—When anything happens to a sawing machine a man who interferes with it may meet with an accident, because he is not experienced in such things.

2772. Do you know of any accidents that have taken place owing to that?—I believe there are some which have happened in that way, but I cannot refer to any just at this moment. I do not know of any that have happened lately, but some men have met with accidents with the belting.

2773. Do you mean by putting on the belting?—Yes, by climbing to the shafting, and getting into danger in that way.

2774. You do not recollect any accidents which have happened in that way?—No, I do not. I have never seen one myself.

2775. Do you know of any that have happened?—I have heard of some, but cannot refer to them specifically. I do not remember them well enough just now to go into details about them.

2776. Do you think accidents of that kind are numerous?—No, I do not think they are; I am guilty of the same thing myself, that is, interfering with the machinery. There is no man kept to see to that work, and the men consequently meddle with it themselves.

2777. Are you aware that during the last 19 years only one fatal accident has happened to a slate dresser from machinery above ground?—That may be so. I have not looked into the inspector's reports to get the figures, but what I say is that accidents may happen, and frequently do happen, which are not fatal.

2778. Is there any other suggestion you would like to make?—No; I am not aware that I can suggest anything else. I believe great improvements are being carried on in the mills, but I think proper superintendence should be kept over the men to prevent accidents.

2779. What about the chains for drawing back the tables?—Some sawing machines are without a pulley for drawing the machine back, and others have a chain. I believe it would be a great improvement if they were all provided with them, rather than to have to put the chain around the axle. There are some with back gear, and some without.

2780. Are not those that are without back gearing few in number?—Yes; they are not numerous.

2781. You also suggest that a ladder should be supplied for the use of each section in the mill, so that the men may not have to climb up the shafting?—Yes.

2782. What do you mean by "climbing up the shafting"?—When the belting is off the upper wheel, if there is no proper ladder, the men must climb to the shafting.

2783. Is the shafting not horizontal?—Yes, but the man must climb up to it.

2784. (*Mr. Jones.*) How many tables are there in the mill that you work in?—I said, at the commencement, that my evidence is not confined to any particular

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quarry. At the place where I work there are 10 or 12 tables.

2785. How many tables are there in the largest mill that you know of?—24, I think, is the largest number.

2786. And you want an inspector to attend to these tables; how many inspectors would you like to see in a mill where there are 24 tables?—I have not suggested that an inspector should be appointed, but that proper superintendence should be kept over the machinery, to prevent men who do not understand them from interfering.

2787. What do you mean by "proper superintendence"?—I mean that the sawing machines and so on should be seen to properly by someone who has to look after them, and in that case there would be no necessity for any of the workmen to interfere with them.

2788. You are speaking of things in general; is it not the fact that the supervision of these tables is attended to in almost all the quarries that we have had evidence about?—I cannot say but that there is supervision to some extent, but I think it could be improved upon.

2789. (*Chairman.*) Is there not at the present time someone inspecting and superintending the tables where you work?—Yes.

2790. And is there not a loose pulley with a fork for each sawing table in that mill?—Yes.

2791. (*Mr. Jones.*) Do you not think that you ought to put the saddle on the other horse, and provide that every young man should receive some instruction with regard to these tables before he takes charge of them; would that not be more effectual than to have an inspector?—It might be an advantage.

2792. Would that be equally as good for the safety of that young man himself as an inspection by an outsider?—If that man were a quarryman, he could not be a fitter as well.

2793. I do not mean that he should repair the machinery. Supposing there are 24 tables, you would have to have 24 fitters or 24 men who knew how to work a table, according to your view; what would the other tables do when the man would be at one of them giving instructions; what would the other 23 tables do?—Sometimes a table does not require repairing more than once a month. All the machines do not get out of repair at the same time.

2794. But you are confining yourself to the question of repairs now, and not to the ordinary working of the tables. You gave us the impression that the ordinary workman does not understand much about sawing machines. Is that your experience? How do you intend to carry out the suggestion that you have made to the Committee?—I believe myself that most of the men know all about the machines, but they are not able to carry out repairs.

2795. Have you ever repaired a sawing machine, are you in the habit of doing so, or have you ever been asked to repair your own table?—When I was working at the Llechwedd Quarry, I would not be able, perhaps, to find the man who attended to that work just when he was wanted. He might be engaged in another part of the quarry, and rather than wait for him for hours I would prefer trying to repair it myself.

2796. (*Mr. Evans.*) Have you any ladders now to do the work that you have referred to?—I know where there are ladders.

2797. Do you know of any place where there are no ladders?—No, I do not know of any cases of the kind. I simply made the suggestion to prevent accidents, and that there might be no excuse for climbing up.

2798. You say there are ladders there at present?—I think it would be advisable to have a ladder in connexion with each section, so that there may be no necessity to climb.

2799. But you say there are ladders provided at the present time?—There may be quarries where there are none provided.

2800. Have you got one yourself?—Yes.

2801. (*Mr. Jenkins.*) You said with regard to the mills that they were being repaired and improved at present. Have they been repaired lately?—What I meant to say was that the mills which are being built at present are better than the old mills.

2802. Do you work in an old shed or in a new one?—I cannot say how old it is. It was not built lately.

2803. Does it require repairs?—It would be a very good thing if it had a coat or two.

2804. A coat or two of what—paint?—Of repairs.

2805. Is it rainproof?—No, not altogether.

2806. Do you get wet there?—Yes, I get wet where I work.

2807. You say that you want proper ventilation in the sheds, we have had it in evidence that there is plenty of ventilation in the sheds in your quarry, is that so?—Yes, I believe there is too much.

2808. How do you explain that?—It is draughty.

2809. (*Chairman.*) You state in the letter you sent as to the points upon which you would give evidence that you would like to have "winding ventilators;" what do you mean by that?—I meant revolving ventilators. When the mills are being built revolving ventilators should be provided to draw out the dust. The dust has a tendency to ascend, and there is no room for it to go out of the sheds unless something of that kind is provided.

2810. (*Mr. Jenkins.*) Are the sheds where you are working at built of stone walls?—We have pillars there on one side and the other side is built of walls with doors in them.

2811. Would it be an improvement if they were built with a wall all around, and doors in it?—Yes, no doubt it would.

2812. (*Chairman.*) How long ago is it since you worked at the Llechwedd Quarry, and you were not able to find a man to repair your table?—I did not say that I could not find him. When I worked there, I remember a time when there was a difficulty in getting him just when he was wanted, and rather than lose two or three or more hours in going in search of him it would be less trouble for me to try to make up the table anyhow myself. He might have been engaged elsewhere, and have work to do which might take him some hours to finish.

2813. Did you know that he was engaged elsewhere?—When I inquired for him I would be told that.

2814. But those were very trivial repairs that you would make?—Yes, certainly. I would only be able to undertake very simple repairs. If we wanted screws for the belting, or to tighten it, or something of that kind, I could do it.

2815. Are there not proper tools for that kind of work kept in the mill?—Yes, but we have no right to interfere with those.

2816. (*Mr. Jenkins.*) The man you have just referred to is a man employed to repair the machinery, and not to examine it with the view to finding out whether there is anything wrong or not, is that so?—Yes, he is to repair only.

2817. What kind of a place have you to eat your dinner in?—There are some small huts which have been built lately.

2818. Were those prepared by the employers?—I cannot say what the connexion of the employers is with them. They have been erected, and we are allowed to eat there. We are also allowed to eat in the place were they sharpen the saws.

2819. Who built those huts?—I think the men built some of them.

2820. You do not know of any eating houses which have been built by the owners?—No; I do not know of any.

2821. (*Mr. Jones.*) Is it not within your knowledge that a large dining-room has been built at the Votty and Bowydd Quarries by the proprietors. I believe you call it a "dinner-house"?—Yes, I know of that; but it has been converted to another purpose during the last few years.

2822. Was that place given up by the men, or were they prevented from going there?—I cannot answer that question; I was not at the quarry at the time.

2823. Would you be surprised to hear anyone say that the men themselves gave up using the place?—All I can say is that at the time I worked there, about 18 years ago, it was very popular amongst the men.

2824. (*Mr Jenkins.*) And did that arrangement afterwards fall through?—I do not know; but the place is used for another purpose at the present time.

2825. Then it is not used as a dinner-house now?—No; it is a barracks.

2826. It is rented to the men?—I do not know of my own knowledge that it is rented; but I suppose it is. That is the practice with the barracks.

2827. (*Chairman.*) Do you live in barracks at the quarry?—No; I go down by train every night.

2828. How do you find the train accommodation on the Festiniog Railway?—It is rather bad.

2829. In what way?—The carriages are overcrowded for one thing; they are also very unsuitable for the men to travel in. I do not think they are what they should be.

2830. Are they lighted?—No, the only light there is is what the men bring with them, a candle from the works, or something that they may like to buy.

2831. Do the trains run at convenient hours?—The time is pretty good, but they happen to be late sometimes.

2832. At what time do you leave Penrhyndeudraeth in the morning now?—At 6.5 a.m.

2833. And at what time do you reach Duffws?—At 6.50.

2834. At what time do you begin work in the mill at the Votty and Bowydd quarries?—About 7.30.

2835. (*Mr. Jenkins.*) Can you commence work in the mill now as early as 7.30?—We commence there at the same time as they do in the other quarries. The time varies just as the day happens to be.

2836. Is it light enough at the present time for you to be able to commence work there at 7.30?—It is rather dark in the mills at that time just now.

2837. (*Mr. Jones.*) Does the train take you there too soon in the morning?—It is a little too soon these dark mornings.

2838. (*Chairman.*) How does the train suit you in the evening?—It starts now at 5.15, and reaches Penrhyndeudraeth at 6.5.

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2839. (*Mr. Jenkins.*) Is the time of the quarries fixed according to the railways, or that of the railways according to the quarries?—The railways according to the quarries, I should think; they change the times of the trains according to the time the bell rings at the quarry.

2840. Do you know that it was stated otherwise before the Royal Commission on Labour?—I did not read that evidence through, so I cannot say.

2841. Are you taken there too early in the morning? It differs according to the place a man works at. For the Votty and Bowydd it is a little too early, but at the Maenofferen they require more time, and at the Upper Oakeley also.

2842. At what time does it get light enough for you to commence work?—About 7.45 to 8.0 just now, but we never take particular notice of the time, we begin to work as soon as it gets light enough.

2843. You are quite sure you can do your work properly at 8 o'clock?—Yes, I believe so, but I have not taken special notice of the time.

2844. Is that the time throughout the winter, is 7.30 the time of the bell?—I have not noticed that. I do not think it is, but it varies according to the length of the day.

2845. Does it follow the day always?—Yes.

2846. (*Mr. Evans.*) What do you mean when you say you are able to do your work at 8 o'clock, what work is that, would it be splitting or dressing slates?—It depends what the first work is that I have to do that particular morning.

2847. Have you any work that you could do before it is perfectly light?—Yes. If we want to change the saw, or anything of that kind, we can do that when it is pretty dark.

2848. So you have some work there which you can do when it is not quite light?—Yes, if there is any necessity for it.

2849. But you sometimes have it to do?—Yes.

Mr. William Williams examined.

Mr. W. Williams.

2850. (*Chairman.*) You live at Minffordd?—Yes.

2851. And you work at the New Welsh Slate Quarry?—Yes.

2852. What is your occupation there?—Rockman.

2853. How long have you been a rockman?—For about 12 years.

2854. Have you worked at other quarries besides the New Welsh Slate Quarry?—No, not in a slate quarry; but I worked in a sett quarry in the neighbourhood in which I live for about nine years.

2855. But I understand you to say that you have worked for 12 years as a rockman at the New Welsh Slate Quarry?—Yes, and I worked for six months at something else before that.

2856. What suggestions would you like to make to us?—I consider that there is a good deal that is dangerous in regard to the quarries, and that great care should be exercised.

2857. What do you consider are the principal dangers?—Falls of rock from the roof, and from the pillars, and from the fore-breast.

2858. And how would you prevent accidents from falls from the roofs and the pillars?—The workman in particular, as well as the management, should take every care, and see that everything is put safe.

2859. What else do you think ought to be done?—I do not think much can be done to prevent accidents except to take every possible care.

2860. You have intimated that you wish to speak about the use of explosives, what would you suggest with regard to that?—I should like to say that every care should be taken with regard to that; I do not believe that anything much can be done by the framing of rules, and that it is for the men themselves to take every possible care in using the powder. That, in my opinion, is the most likely way of preventing accidents.

2861. I believe you also desire to speak of the good and evil effects on health of working underground, what is the good effect on the health of the men by working underground?—I believe that one advantage is, that the temperature is very even down below. There is not much difference in the temperature there between summer and winter.

2862. And is there any other advantage?—I do not think there is much advantage from that, except that one is able to work in a dry place, and not in a wet place.

2863. Do you think it would be an advantage to the men to have a place where they could change their clothes before commencing work and after leaving off work?—I do not think it would be of any advantage, because it is only in a few instances that the men do get wet, and when they do get wet there are places where they can dry their clothes now—the boilers and so on. As far as I can see, I do not think that any special provision of that kind is wanted.

2864. Do you travel backwards and forwards to Minffordd every day?—Yes, I do; and I have done so regularly since I commenced to work at Festiniog, 12 years ago.

2865. And do you like that better than living on the spot?—Yes, I do.

2866. Why is it better?—For one thing, I prefer to live in the country, as I do now, than among the rocks here.

2867. Do you think you get a better climate there—say, less rain, for instance?—Yes, I know we get less rain there and less mist.

2868. And can you get house accommodation cheaper there than you can here?—Yes.

2869. How do you find the railway accommodation?—The general complaint is that the carriages are overcrowded. There is too little room in them by a long way.

2870. You find that to be the case yourself?—Yes, I do. There are 16 travelling in one carriage, and that is too many by far.

2871. Are those special carriages for the workmen that you have, or the ordinary third-class carriages?—They are special carriages for the workmen.

2872. And have you special cheap tickets?—Yes.

2873. What does your ticket cost you weekly?—2*s.* 2*d.*

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2874. (*Mr. Evans.*) Do you know anything of the special rules now in force at your quarry?—Yes, I do. We have all had a copy of them.

2875. And do the men adhere to those rules?—I believe that on the whole they do.

2876. Is it possible that none of the men pay attention to them?—I do not believe it is possible.

2877. What kind of tools have you for blasting—the tamper and scraper and so on?—Most of the men have an iron tamper, but the wooden tamper is used as well. We have definite instructions to use the wooden one.

2878. Have you any copper tampers?—Yes, I know there are some, but I do not know how many.

2879. Have you one yourself?—No, I have not, but I have a wooden one.

2880. Did you ever see one of the copper ones in the works?—Yes, I have seen them.

2881. Have you seen any other copper tools in the works?—No, I cannot recollect that I have at present.

2882. Do you know that the present rules require copper scrapers and other tools to be used?—I do not know anything as to that. I am not aware that they call for copper scrapers.

2883. You are aware, I suppose, that you are not to use iron tools with powder?—Yes, I am aware of that. There is a rule to that effect.

2884. Do you agree with that rule?—No, I do not.

2885. Do you object to use copper tools?—Yes, I do.

2886. What objection have you to those?—The copper tampers do not wear so well. I have not seen the copper scrapers.

2887. Can you refer to any accidents which have taken place with explosives in consequence of using iron tools?—I have not seen any myself, and I believe I can say that I have had as much experience with powder as most men; I have had 20 years' experience with it. I worked at a sett quarry at one time, where I had nothing to do, but to attend to the blasting; I used two tons of powder in a year there, and I used nothing but iron tools.

2888. So that you do not agree with special rule 22?—I consider that a wooden tamper with gelatine or gun-cotton is a very proper thing; but in regard to gunpowder, I do not think it is at all necessary when we have only a tamping of one or two inches. In the pillaring hole we only use about that.

2889. (*Mr. Jenkins.*) Have you more objection to the copper tamper than you have to the wooden?—No, I have not.

2890. You say you have a wooden tamper?—Yes.

2891. And do you use it?—Yes, I do. I use it because the rules require it.

2892. On what occasions do you use them?—I must use them to everything. If the agent saw me not using it, I would be fined.

2893. Do you always use it for the first and second tamping?—I suppose I am not required to come here to say I have broken the rules of the quarry?

2894. Do you use it always?—I carry it with me always, whether I use it or not.

2895. You said that the copper tampers would not last. Do you know that it is possible to make them to last, say, for six or seven years?—I cannot say anything as to that.

2896. If that can be done, would you have any objection to use them?—No, none whatever.

2897. Would they be more convenient than the wooden tampers, if the copper tampers could be made to last?—Yes, they would be undoubtedly, if we were allowed to use them without using the wooden ones.

2898. You said that in order to prevent accidents it would be well to take more care; have you any experience of men who have not taken proper care in their work?—I believe that most of the accidents which have proved fatal, since I have been at the quarry, were due to the negligence of the men themselves.

2899. Is the accident due to the negligence of the men if it is due to a fall from the roof?—No, unless they know it to be dangerous.

2900. Have you seen many accidents of that kind, within your knowledge, at the New Welsh Slate Quarry—accidents from falls from the roof or the sides of a pillar?—No, not many.

2901. Is it a fact that 50 per cent. of the accidents happen in that way?—No, I do not believe it is.

2902. Do you know of accidents of that kind?—The one most like that was the one referred to here this morning, in which two men were killed.

2903. (*Chairman.*) That was the accident which happened in February 1892?—Yes.

2904. Was that the fault of the men themselves?—No, I believe not.

2905. (*Mr. Jenkins.*) They knew nothing about it?—One of them did not know anything about it. He had only just gone there. I do not know whether the other man knew anything about it or not.

2906. Are the men apt, under certain circumstances, to leave loose things on the sides of the pillars?—Yes, they are.

2907. Are there any inspections, or is any care taken to prevent that?—I am not aware that there is.

2908. Do you not approve of the suggestion that the owners should be compelled to provide a special man to do that work—to inspect every "thickness" before it gets out of reach?—No, I do not. I believe the men themselves will do that work better than it would be done if another man were set to do it.

2909. Would not the appointment of such a man tend to make the men themselves more careful?—No, I do not think it would. There is an inspector now, and if it can be proved that they have been careless they will be prosecuted.

2910. Who would you hold responsible for an accident which occurred now through negligence which occurred 10 years ago?—The thing seems incredible to me. In our quarry we have no chambers that are worked for that length of time.

2911. If a man is negligent on a certain occasion, and leaves the rock loose, say, on the side of a pillar, is it possible that in 10 years' time they would fall upon a man who works in the chamber below?—I believe it might happen in less time that that. There are things which a man fails to bring down without using explosives, and he may leave them and think they are safe, and they may become loose afterwards and fall down.

2912. So that pieces may fall in that way after they have been left loose through carelessness?—Yes.

2913. In such a case whom would you hold responsible?—The man who had left it there.

2914. But suppose he had gone away to America or somewhere else?—In that case you could not get hold of him, of course.

2915. Would you not hold the company responsible to see that every place is made safe before it gets out of reach?—Yes, that ought be done as far as they can.

2916. And that they should enforce all rules?—Yes.

2917. Are the men obliged to adhere to the rules at the New Welsh Slate Quarry now?—Yes, I believe they are.

2918. Is it true that pillars are cut there; that is, that bargains are set to the men to work in pillars?—It has been the case.

2919. Is it the case there now?—I do not know. I do not remember any case in particular just now, but where there are levels, and the rock gets loose of itself, they work those in the pillars.

2920. Are you a rockman now?—Yes.

2921. Were you a witness in the recent action brought against the company; were you a witness on behalf of the company?—No, I was not.

2922. Who asked you to give evidence here?—No one asked me specifically.

2923. Has anyone asked you indirectly to come here to give evidence?—The agents said in the quarry that it was being reported that the men in our quarry were afraid of giving evidence before this Committee, and they wished some of the men to come here.

2924. Therefore, you volunteered to give evidence upon the manager asking you in that way?—Yes, to a certain extent.

2925. Did he know what you had to say here?—No, not in the slightest degree.

2926. Who sent in your evidence?—I sent it in myself.

2927. Is it in your own handwriting?—Yes.

(Mr. G. J. Williams here explained that notices were sent to the men asking them to mention the points upon which they proposed to give evidence. The agents knew where the men lived, and he (Mr. Williams) asked the agents to deliver the notices to the men, and they were returned on Saturday night through Mr. Robert Roberts, Groesffordd. The time was too short to allow the notices to be sent to the men direct and to be returned by them individually.)

2928. To whom did you give your evidence in writing?—I gave it in a letter. I got a letter from Mr. G. J. Williams, through Mr. Eames, asking me to mention the points I intended to refer to, and I wrote a reply myself and gave it to Mr. Eames, and he said he would send it to Mr. Williams.

2929. Are you a bargain-taker at the quarry now?—Yes, I am.

2930. Were you a bargain-taker there before Mr. Owen came there?—Yes.

2931. Is it a fact that in the Cwmorthin Quarry there are natural causes which tend towards accidents?—Yes, there are so many "bevels" in the rock, and the rock is small in several places, and liable to break. There are many small joints, especially the "bevels."

2932. Have you heard it said that if the Cwmorthin Quarry were inspected minutely, the same as other quarries are, that it would have to be stopped?—No, I have not heard that.

2933. If that is said, is it true?—I do not know how the other quarries are being inspected. I have not been working in any of them, so I cannot say anything about them.

2934. You have no reason to believe that that is true with regard to your quarry?—No, I have not.

2935. (*Mr. Jones.*) Do you know, as a fact, that there is any difficulty in obtaining witnesses, or any hesitation on the part of the men at your quarry to come forward to give evidence at this inquiry?—I do not know.

2936. (*Mr. Jenkins.*) Do you know that certain men from your quarry have refused to come?—No, I do not.

2937. Do you know that the workmen's committee have failed to get a witness from your quarry?—No, I do not.

2938. (*Chairman.*) Have you anything else to say?—It was said by one of the medical witnesses that it is not so healthy to go and come by train as it is to live in the neighbourhood, and that this can be proved by figures taken from the report of the Oakeley Quarries Sick Fund. I rather doubted that statement when I read it. So far as I am personally concerned I have not been a fortnight poorly during the 12 years I have been going and coming by train daily. I asked to be allowed to see the sick list belonging to our quarry, and the secretary gave me the figures. The payments have only been made up for the first four months of last year. 44 of the men go by train night and morning, and 243 live in the district. The men who go by train received sick pay amounting to 2*l.* 17*s.* in those four months, as against 31*l.* received by those who live in the district. The proportion between those who live in the district and those who travel by train is as 5½ to 1, but the proportion of the sick pay paid to them is nearly 11 to 1. Those figures prove quite the opposite to those quoted by the doctor.

2939. (*Mr. Evans.*) What doctor was that?—Dr. Evans.

2940. (*Chairman.*) What months do the figures refer to?—The first four months of the year.

2941. To January, February, March, and April 1893?—Yes. The secretary had not made up the accounts for the rest of the year when I got those figures from him.

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2942. (*Mr. Jenkins.*) You referred in your evidence to the fact that the temperature underground is more even?—Yes.

2943. Do you think that the workman gains by that?—I consider myself that he does, but there are no doubt disadvantages which counterbalance that.

2944. What are those disadvantages, in your opinion?—The place is damp and smoky.

2945. Do you consider that he gains by the evenness of the temperature underground?—I believe he does.

2946. How many times a day have you to go in and out from that even temperature?—I do not come out at all.

2947. You come out at night?—Yes.

2948. Is the temperature the same underground and above-ground?—No, it is not. I took a thermometer with me to test it, and I found that in the hottest day of the summer it registered 80 degrees in the shade outside, and underground it was only 54°.

2949. And I believe the same difference would be observed in the winter?—Yes, I tried it on a cold day about a fortnight ago, and found that it was 21° outside and 51° underground.

2950. So that the underground workman has a more variable temperature to contend with than the men who work above-ground?—Yes, he has, but they provide more clothing in consequence of that.

2951. (*Chairman.*) And would he not be going out from his own warm house into the cold air in any case?—Yes, he would.

2952. (*Mr. Jenkins.*) Would you feel the cold at night in the winter time rather keenly?—Yes, I would.

2953. After having worked in the quarry all day?—Yes, naturally, and of course I put more clothing on after coming out.

2954. As a rule, do the underground workmen feel more from the cold than the above-ground men do?—Yes, they do.

2955. As to the question of drying clothes—you said that you got them dried at the boilers—are you allowed to go to the boilers to dry your clothes?—The boilers have been bricked round, and there is plenty of heat there to dry the clothes.

2956. And you are allowed to take your clothes there to dry?—Yes, I never saw anyone object to it.

2957. Do your special rules not forbid anyone to go to the engine-house?—I am referring now principally to the engines underground.

2958. But do not the rules apply both to engines outside and inside?—There is no house for the underground engine, so that the rule cannot be applied.

2959. But does not the rule apply to the space immediately around the underground engine?—There is a place where we have to pass close by.

2960. (*Chairman.*) Have you anything else to say?—There is one thing which should be attended to underground. I refer to the privies. I consider it would be beneficial to the health of the workmen if proper privies were provided underground. When there is an old disused chamber, the men go there, and that makes the air impure.

2961. (*Mr. Evans.*) And what is your suggestion to meet that state of things?—That pails should be provided, or a hole with water in, so that they might be cleaned periodically.

2962. Do you think that is practicable?—Yes, I think it is.

2963. You believe it is a great nuisance as things are at present?—Yes, it is. The men ought to be compelled to use the same place as privies, and fined if they go anywhere else.

2964. Do you think it is possible that this nuisance you refer to affects the water which the men drink at the bottom of the quarry sometimes?—I do not think any of the men drink the water down below.

Mr. Moses Kellow examined.

Mr. M. Kellow.

2965. (*Chairman.*) You are the Manager of the Park Slate Quarries, Penrhyndeudraeth?—Yes.

2966. And how long have you been there?—I have been actively associated with the quarries for the last 17 years.

2967. Can you tell us anything about the method of working you employ at that quarry?—As I have already stated, I have been associated with the Park Quarry for a period of 17 years. During a large portion of that time I have taken an active part in its

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management, and latterly it has been solely under my control.

The slate beds in the Park property are, in point of geological age, identical with those worked at Blaenau Festiniog, but differ from them in several characteristics.

The bedding dips at an angle of 42 degrees in a direction 30 degrees W. of N.; the cleavage dips at an angle of 76 degrees to the N.W.; the line of intersection of the planes of pillarage and cleavage dips at an angle of 27 degrees to the N.E.; and the plane of pillarage, without reference to the cleavage, dips at an angle of 30 degrees in the direction of 18 degrees N. of E. I refer to the magnetic meridian in all cases.

The plan upon which the quarry was opened at first was that common in underground quarries, viz:—The formation of chambers, with intervening pillars, the working face of rock being opened up on the upper or N.W. side, and the progress of the chamber as operations proceeded being towards the S.E., or underlie of the vein.

The peculiar direction of the pillarage, which neither coincided with the floors of the galleries nor the sides of the pillars, and the unfavourable prevailing direction of the joints, made the extraction of the slate rock difficult and expensive. Moreover, the igneous rocks which are associated with the veins at Blaenau Festiniog were thinned out to nothing in the Park property; hence the chambers had to be formed with a slate roof.

In view of working several galleries, it was deemed inexpedient to rely upon this. The outcome of these difficulties was the gradual evolution of our present system of working, which I will attempt to briefly describe.

A point is selected (the deeper the better) which for the time being is regarded as the bottom of the quarry. An incline shaft, following the dip of the vein, is sunk to this point, and levels are driven therefrom to the right and left along the face of the vein. The position of each chamber is then decided upon, and a cross-tunnel is driven through the vein in its centre line. This forms a "loose end" or side for undercutting the rock through to the pillars on each side of the chamber. After the completion of this operation, the opening is continued upwards in the plane of bedding at the back or underlie of the vein for, say, six or eight yards at the highest point, diminishing as the pillarage approaches the floor. A "loose end" or side is then cut at the S.W. side of the chamber, and by means of a pillarage hole bored from the face formed under the vein in the plane of bedding a mass of rock is detached, the operation being facilitated by its own weight. (Figs. 11 and 12. p. 84.)

I may state that bedding joints are frequent, and can generally be relied upon to free the mass on the upper face. Moreover, with regard to the foot-joints, which name I may be permitted to use for their identification, but which in the case in question is really a misnomer, their prevailing direction is vertical, so that the rule is that the lower end of the mass of rock removed will be freed by a foot-joint which forms with the pillarage an obtuse angle. Thus the necessity for second charging of the hole is rare, and the unremoved rock is left sound and safe above. The removed piece of rock forms the loose end for the next piece, and by the time the opposite side of the chamber has been reached a face has been formed from which the next overlying bed can be operated upon in like manner.

The slate rock taken down is trimmed where it falls, and the valuable portion only is sent to the mills. The rubbish is allowed to remain in the chamber, and fills up the space as fast as it is formed by the removal of the rock. The rubbish floor forms a cushion upon which the slate rock when blasted falls, and thereby prevents its being shattered, as is frequently the case when falling from a height upon an unyielding rock floor. But by far the most important function performed by the rubbish is the effective support it affords to the roof overhead.

The tunnels of communication are at the face of the vein at the regular gallery intervals, and as the floor of the chamber rises, a short single-road incline is used to connect it with the gallery next below.

To summarize the advantages of the system: The rock can be removed in larger masses individually, and in greater quantities collectively, with a less expenditure of labour. It goes to the mills in a sounder condition, thereby producing a greater proportion for the market. The cost of the removal of the rubbish is entirely dispensed with, and last, but by no means least, falls of roof are rendered absolutely impossible.

2968. What you have told us now is with reference to the method you have been using at your quarries?—Yes.

2969. And you have been working in that manner for many years?—Yes.

2970. When you say that falls of roof are absolutely impossible, is it not a fact that a man was killed by a fall of roof at the Park Quarries?—No, it was not by a fall of roof.

2971. It was the case of Owen Williams, a rockman, 36 years of age, who was killed at your quarries in 1891 by a premature and unexpected fall of slate rock from the roof which had, only a short time before that, been examined and reported safe?—That was not the roof proper, but a piece of rock from what was our working face.

2972. Then it was the working face?—Yes, and what I refer to in my statement is the roof proper of the chamber.

2973. This was a piece of rock above the men's heads?—Yes.

2974. It was the roof for the time being of the excavation where the men were standing?—Yes.

2975. (*Mr. Jenkins.*) What is the thickness of your vein?—About 16 or 17 yards, measured at right angles, but it is not exactly uniform.

2976. And it dips at an angle of 40 degrees?—About 42 degrees. That is the average.

2977. And you find that your system works well?—Yes, it works very well indeed. With reference to the question upon which I have been asked to express an opinion by Dr. Foster, as to whether the system could be applied under the conditions existing at Blaenau Festiniog, I may state at the outset that I approach the matter with a great deal of diffidence, arising from a due appreciation of the great complexity of the elements of the case, but nevertheless if forced to state my opinion, *pro* or *con*, I should say that the system in its entirety could not be carried out in Festiniog, but I do think the germ of the plan, embodied in a considerably modified form, could as a matter of possibility be carried into operation with perhaps many and important advantages.

The main feature of any such plan would be to secure the support of the rubbish for the roof above, by filling up the space created by the removal of the rock, and to prevent the possibility of the recurrence of the disastrous falls, which at present involve great danger to life and financial loss to the quarry owners.

I will not claim to lay before you a fully developed or perfect plan, but will briefly state the direction in which I should look for the practical development of the idea, assuming the necessary opportunity and competence to work it out, and its application to a new or undeveloped property.

1st. An incline shaft sunk near the face of the vein to a considerable depth, say 10 galleries deep.

2nd. Levels driven to right and left at face of vein at the 10th gallery.

3rd. The opening or "unroofing" of chambers in the usual manner, but extending upwards no further than 7 feet above the level of the floor of gallery 9.

4th. The working of the series of chambers on gallery 10 in the ordinary way, miners being put to cut the top in advance on gallery 9, and the rubbish taken to the tips in the usual way.

5th. When the chamber nearest the shaft should have become worked out, or sufficiently advanced, the rubbish from the 10th gallery to be raised along the incline to the 9th gallery, and tipped into the chambers below until a floor, say 5 or 6 yards wide had been formed. (Fig. 13. p. 84.)

6th. The opening of gallery 9 might then be completed, and the extraction of slate proceeded with as in the gallery below, a free top being cut by miners on floor 8. On this gallery, and all subsequent galleries above it, the carriage of the rubbish to the tips would be dispensed with, as it could be thrown forward under the rock into the empty chamber below, thus forming the floor in advance for the men to work upon. The remaining chambers on gallery 10 would be treated in a similar manner as fast as they became worked out or sufficiently advanced.

By the above plan, the method of extracting the slate rock to which the men have become habituated would remain the same, the best-paying rock usually found in depth would be extracted first, and the working upwards could be discontinued immediately it became

unprofitable from its nearness to the surface. Nearly 75 per cent. of the rubbishing cost would be saved after leaving the 10th gallery, and falls of roof would be effectively provided against.

Several objections occur to me, and I may name them for the purpose of replying to them.

1. The operation of cutting the top of each gallery would appear to involve increased cost, as in the present method the top is already cut by the working of the gallery above. As a set-off to this, the bottom of each gallery has now to be cut, which would be dispensed with under the proposed method, and it is doubtful whether the present system of doing it piecemeal, notwithstanding the occasional advantage that may be taken of joints, does not in the aggregate amount to more than would be the cost under the more straightforward process.

2. That certain combinations of joints might possibly render the undercut rock unsafe overhead. I am of opinion that, except in rare instances, it would not. The foot and back joints have their equivalent in the Park Quarry in numerous pillarage joints, which at first sight might be regarded as an element of serious danger, but I may state that experience shows that the combination of joints necessary to entirely free a mass, so as to cause it to fall is so rarely complete, that with the exercise of ordinary care, the risk on this point is very little. Moreover, I have an instance now in mind where an undercutting of the kind proposed was formed under conditions identical with those at Blaenau Festiniog, without the slightest difficulty being experienced with the rock overhead.

3. That operations could not be carried on to any extent simultaneously on different galleries in the same chamber, and that therefore the number of bargains working at any one time would be restricted by the extent to which the chambers could be multiplied in the direction of the strike of the vein. My reply to this would be that with the advantage of having a free bottom, the output of each bargain would be very considerably augmented; the disposal of the rubbish, now frequently a great hindrance, would cease to be a difficulty; operations could be expedited by the application of electric or other motive power to the cranes; or if a still larger output were desired, a second series of chambers might be worked simultaneously at an 8 or 10 gallery interval below the first.

Regarded, however, from a commercial point of view, most quarry owners would prefer a more limited quarry, where working could be commenced in the best rock, and profits quickly realised, to a more extensive one, where, for a long period of years, the operations had to be confined to the upper galleries where the working was unprofitable, or comparatively so.

I may further state that I look, with some degree of confidence, to the possibility of extracting the whole of the slate rock, pillars included, as the ultimate result of the application of the principle of working I have sketched out, but I am not prepared to go further into details at present, feeling that I have already unduly trespassed upon your patience.

My apology for presuming to place before you these suggestions, which will, I have little doubt, appear to some minds to be too revolutionary, must be that I have had special facilities for seeing, and in carrying into practical operation, a system which I believe contains a principle that may be developed with advantage to the personal safety of the workmen, and to the financial benefit of the quarry owners, and it will be clearly understood that it is as the advocate of a principle rather than as the propounder of a system of working, that I have ventured to lay these observations before you.

I fully recognise that it is very difficult to get a cut-and-dried scheme prepared, and all that I have done is to point out a principle, I do not advocate any particular plan, I simply advocate the principle, and I believe it is one that can be made something of.

2978. (*Chairman.*) You advocate the principle, because it has been found advantageous to you for many years at the Park Quarries?—Yes.

2979. Therefore it is no new principle as far as underground slate quarrying is concerned?—No.

2980. It is simply new as regards applying it to another district?—Yes.

2981. And to a district where the conditions are not exactly similar?—Yes. This would be my guiding principle, instead of leaving a place empty after it had been worked, I would fill it up. Of course, the best means of going about it would be decided under the conditions which would arise at the time.

2982. (*Mr. Evans.*) Do you find that the plan you have explained has diminished the number of accidents at your quarry?—We have only had the one accident, and that has just been referred to, so that we really have nothing to diminish.

2983. That is the only accident you have had?—Yes. In that case there was a joint in the rock. The rock had been examined and they had failed to discover it, and they pronounced it safe, but it turned out that it was not safe, and a man who happened to be there at the time the rock fell was killed.

2984. (*Chairman.*) It was precisely the same kind of accident that happened a few days ago at the Oakeley Quarries, in which a man was killed?—I cannot say anything as to that accident.

2985. (*Mr. Jones.*) You commence operations on the 10th floor?—Yes.

2986. You mean that you would begin at the very bottom of the vein?—Yes, that is the idea.

2987. And then you would work upwards?—Yes.

2988. And clear the rock as you go up?—I would work the bargain in the ordinary way.

2989. And fill up with the rubbish?—No, I should work that bargain out first.

2990. You mean by "bargain" the thickness of the vein over a certain floor?—Yes.

2991. And after working it out you would fill it up with rubbish?—Yes.

2992. How much of the rubbish that you take out of a certain rock can you put back again?—Nearly the whole of it.

2993. And what do you do with the surplus?—If there be a surplus, we would carry it away.

2994. What proportion of the stuff that you quarry do you send to the market?—We reckon to send out from one-fourth to one-third of the total rock from the quarry to the mills.

2995. Then you have to compress the rubbish back again to the same spot, with that exception?—No, if there would be a margin we could carry it away.

2996. But I thought you said there was no margin?—Of course if there is no margin there is none to send away.

2997. (*Mr. Evans.*) I suppose that a good deal of the waste goes up with the blocks?—Yes.

2998. (*Mr. Jones.*) Supposing you work out a chamber, how many tons of rubbish will you be able to put back again?—If we have 10,000 tons of rock, for instance, 7,500 tons will remain in the form of rubbish in the chamber.

2999. And you can put it there?—Yes, about that quantity. You would allow about one-third for expansion. We fill it in as far as it goes, and if there is any left we take it away.

3000. You will have to keep two things in view—you will have to make special arrangements for carrying it, and you would not be able to fill up the chambers, and the chambers unfilled would not be a proper support?—Of course we have to make arrangements for getting the blocks away under any circumstances, and if we have a margin of rubbish we would simply treat that as if it were a load of blocks, and remove it. I reckon upon the regular gallery intervals, of course. For a considerable time we can walk on the regular gallery floor without any incline, but when it gets high up there is a small incline.

3001. What would you have to guide you with regard to the depth of the vein; suppose you begin to fill up at the tenth floor, you may have other floors below that, and how do you manage then?—In the first place, it would depend very much on your patience.

3002. And purse?—Yes, quite so. Supposing that 10 galleries were regarded as the bottom for the time being, and that you wanted to go deeper at some future time, you would sink another 8 or 10 galleries, and leave a triangular piece to prevent the rubbish slipping down. Those 8 or 10 galleries would be worked in the same manner as the others. You would commence at the bottom and work upwards.

3003. So you would leave a barrier to prevent the rubbish slipping down?—Yes.

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3004. (*Mr. Evans.*) In regard to the matters the Committee are to inquire into,—you would make the roof safe?—Yes, I would not like, in the conditions we work under to venture to open, say, 8 or 10 galleries deep in the chamber with a slate roof overhead depending solely on the sides for support. It will stand, say, for half a gallery, or possibly for one gallery.

3005. Is your slate rock such as will hold the roof as it is generally left in these quarries?—Our roof generally consists of a bedding joint. We have the slate rock above us.

3006. Is that rock sufficient to hold by itself?—It is not, for a number of galleries. It might, perhaps, for a single gallery, but if you wanted to work a second gallery below that, and then a third, and so on, and so increase the space to be supported, I doubt very much whether it would do so. By means of my plan there is the further advantage of being able to work the chambers wider.

3007. (*Chairman.*) What is the thickness of the vein on the horizontal line at your quarry?—About 20 or 21 yards, but it is not exactly uniform throughout the quarry.

3008. (*Mr. Jones.*) Your great disadvantage, I take it, is that you cannot get any large quantity of slates out of the quarry at one time—you could not work many chambers together by your system?—In our case that is no difficulty, because we have a run of about 2 miles on the vein. We are therefore differently situated in that respect to other quarries, but in certain cases that objection might arise. If it could be carried out, there would be the advantage of having the free bottom.

3009. So, really, your extension would be on the line of strike?—Yes.

3010. And not on the line of strike and depth?—Quite so.

3011. (*Mr. Evans.*) If you could work out the whole of the vein in that way, it would be very important commercially?—Yes, certainly.

Fig. 11.

LONGITUDINAL SECTION OF A CHAMBER.

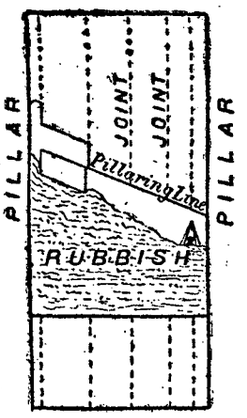
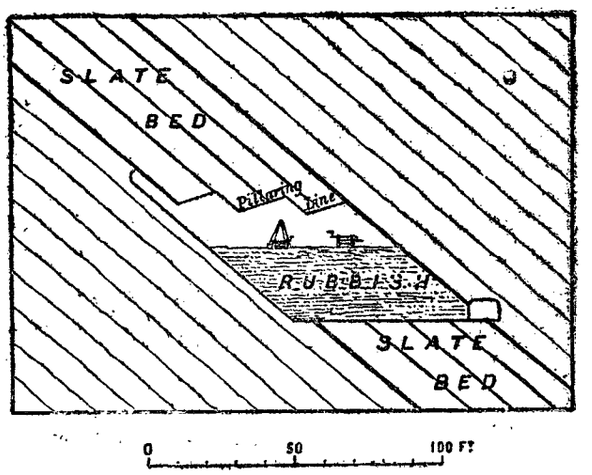


Fig. 12.

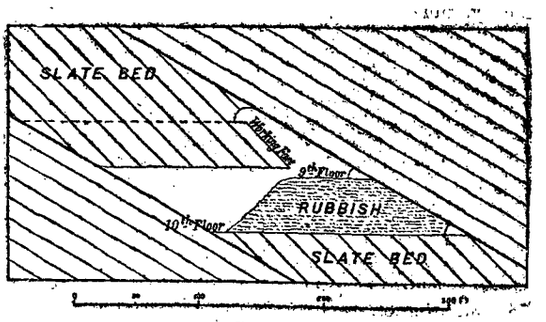
CROSS SECTION OF A CHAMBER.



Scale.

Fig. 13.

CROSS SECTION OF A CHAMBER.



Scale.

PLATE I.

FIG. 1.

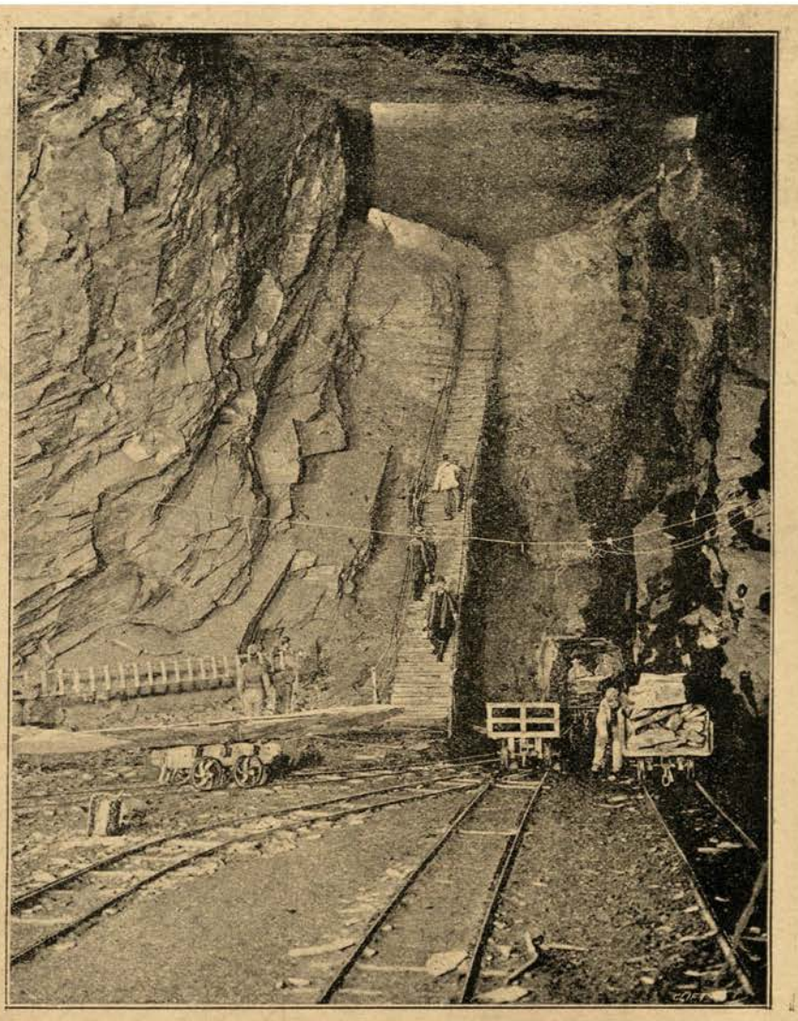


FIG. 1.—Steps in a worked-out chamber of Llechwedd mine, for the descent and ascent of the workmen.

Trolley with a long block of slate upon it on the left-hand side, and two rubbish waggons on the right-hand side.]

Photographed by Mr. J. C. Burrow, by magnesium light.

FIG. 2.

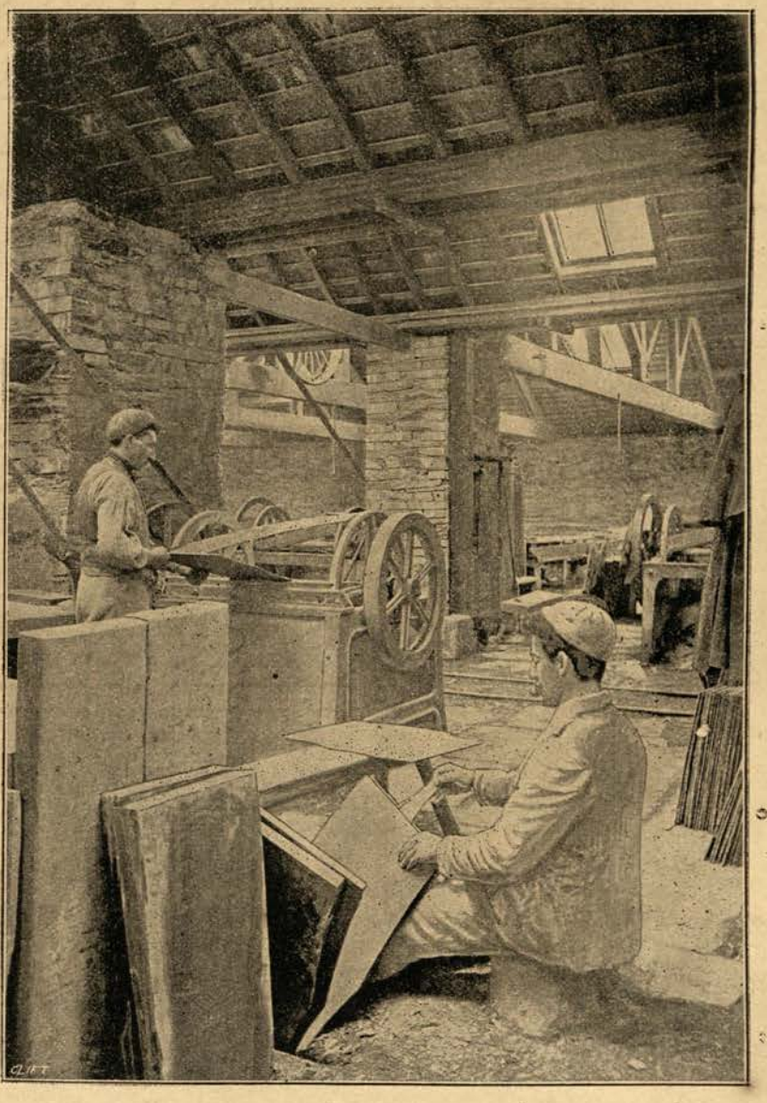


FIG. 2.—Splitting and dressing slate in one of the mills of Llechwedd mine. The man sitting on a piece of wood is splitting open a block of slate with a thin chisel, which had been previously driven in a little with a wooden mallet. The man standing up is "dressing" the thin sheets of slate, that is to say, he is cutting them into rectangular shape by means of the revolving blades of Greaves' machine.

Photographed by Mr. C. Warren Roberts.

PLATE II.

FIG. 3.

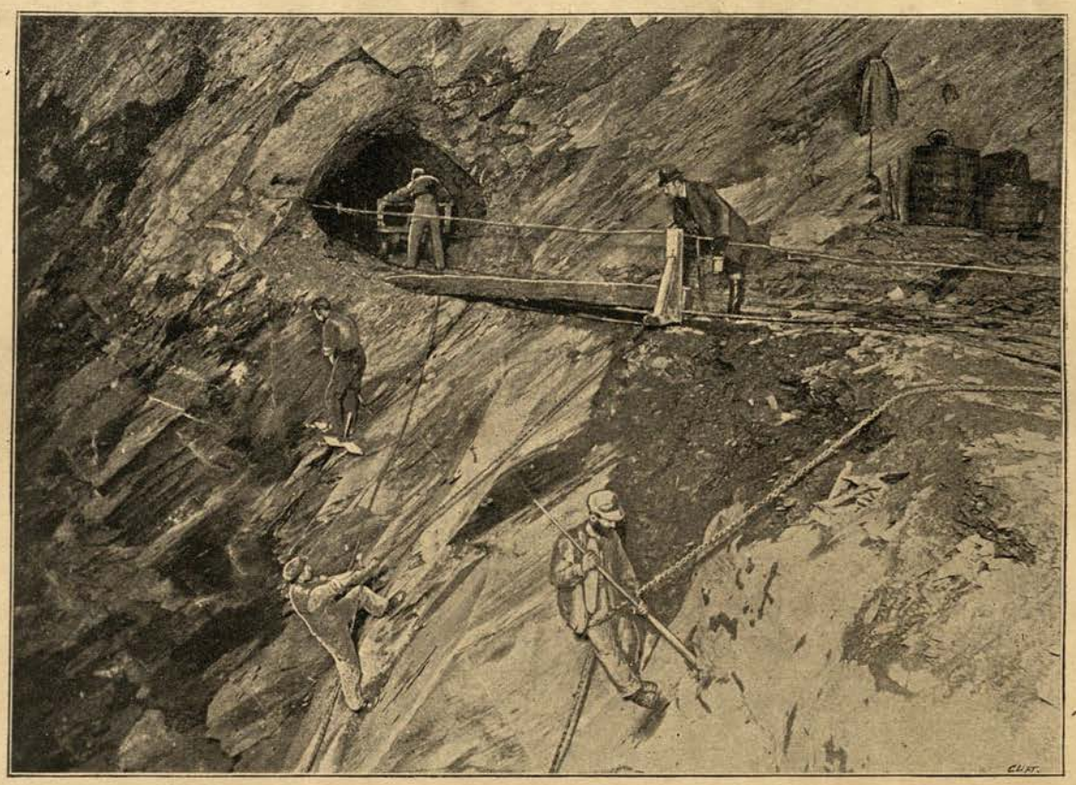


FIG. 3.—Upper part of a working place at Llechwedd slate mine. The man on the right-hand side, supported by a chain round his thigh, is using a crow-bar to prize off a block of slate; the man in the middle is climbing up the steep slope by the aid of a chain, with a candle in his hand; the man on the left is standing upon a little stage made of two boards, resting upon two iron pegs, and is boring a hole with a jumper.

The manager is standing on the tram-road looking over the wire-rope fence at his men, and a trammer is pushing a waggon along the tunnel through the pillar separating this chamber from the next.

The tram-road is 50 feet vertically above the foot of the working face. If the workmen depicted were to slip, they would tumble and roll over a rough and rugged face of rock of nearly that height.

Photographed by Mr. J. C. Burrow, by magnesium light.

FIG. 4.

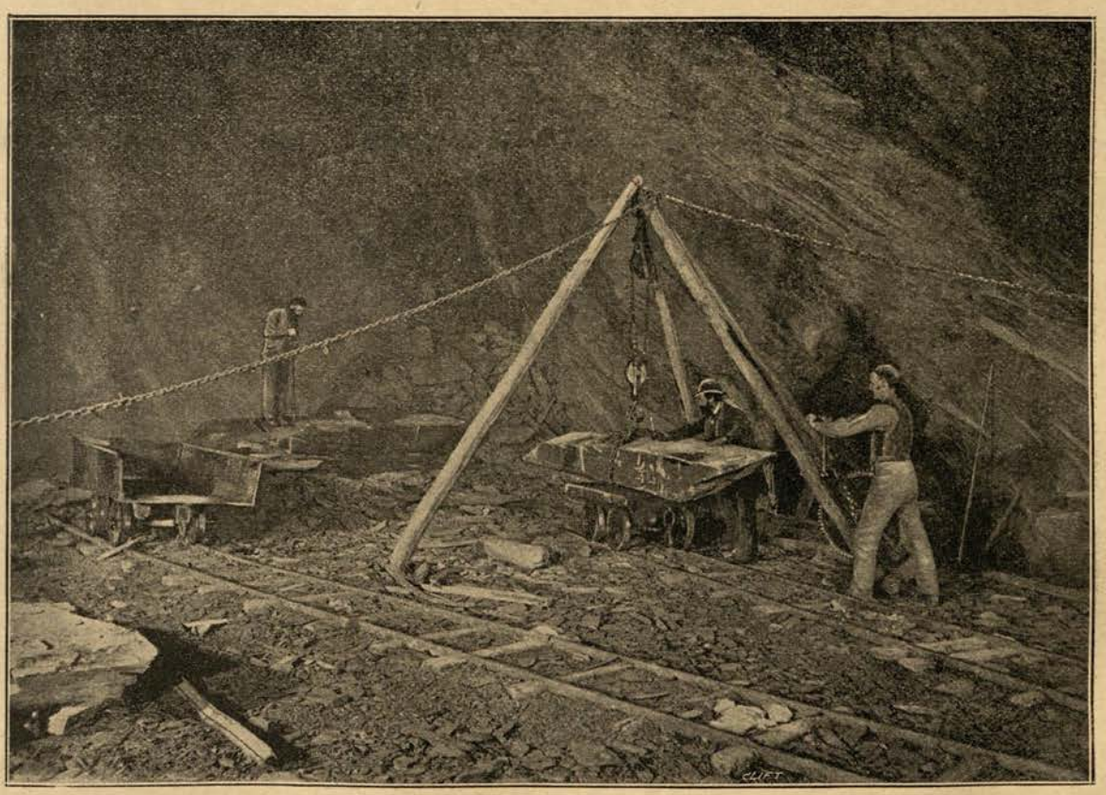


FIG. 4.—Bottom of a working place at Llechwedd slate mine. The man on the left-hand side of the picture is boring a small hole with a jumper in a block of slate lying on the ground, in order to put in the "plug and feathers" and rend it longitudinally along the "pillaring" line.

The man on the opposite side is holding the handle of a winch and is lowering a big block weighing about two tons, whilst the third man standing under the derrick [*crane*, Festiniog] is slewing it into a proper position for resting on the trolley. On the left-hand side of the picture is a tram-waggon used for removing rubbish.

Photographed by Mr. C. Warren Roberts, by magnesium light.

PLATE III.

FIG. 5.

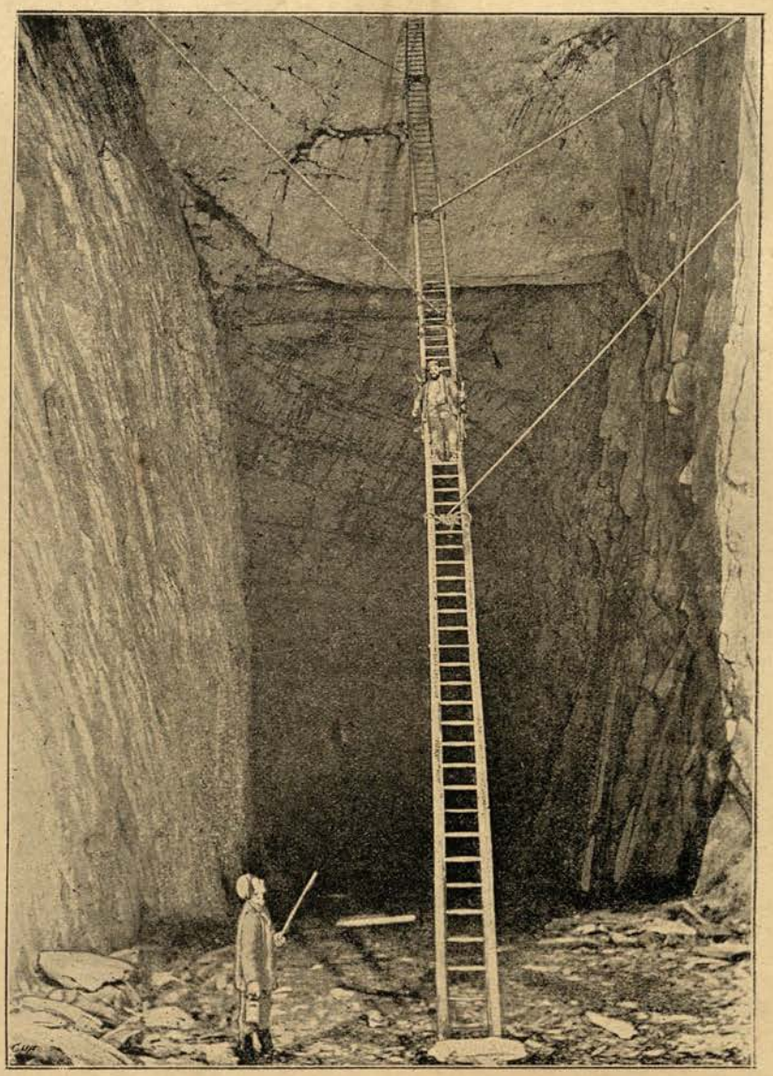


FIG. 5.—Ladder, 86 feet long, erected in one of the chambers of the Oakeley mine in order to examine the roof, which was known to be insecure. The ladder is held in position and stiffened by the guy-ropes.

Photographed by Mr. J. C. Burrow, by magnesium light.

FIG. 6.

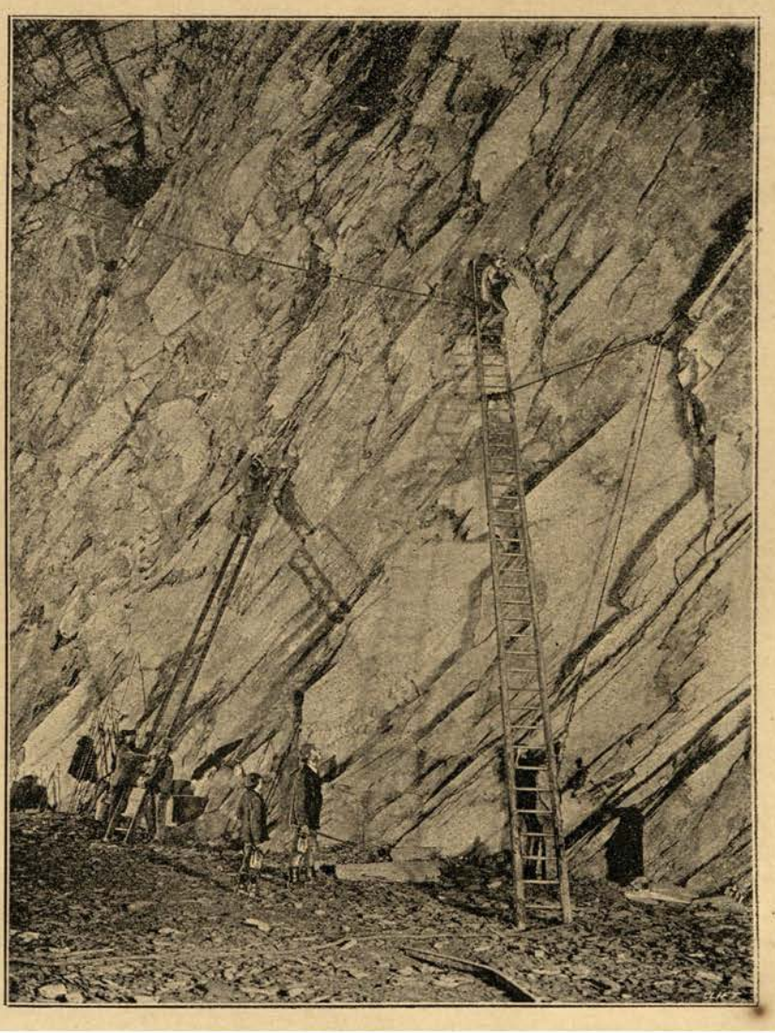


FIG. 6. — Ladders erected in one of the chambers of the Oakeley mine for examining a pillar [*wall*]. The men at work upon the ladders are engaged in taking down insecure pieces of rock.

Photographed by Mr. J. C. Burrow, by magnesium light.

PLATE IV.

FIG. 7.

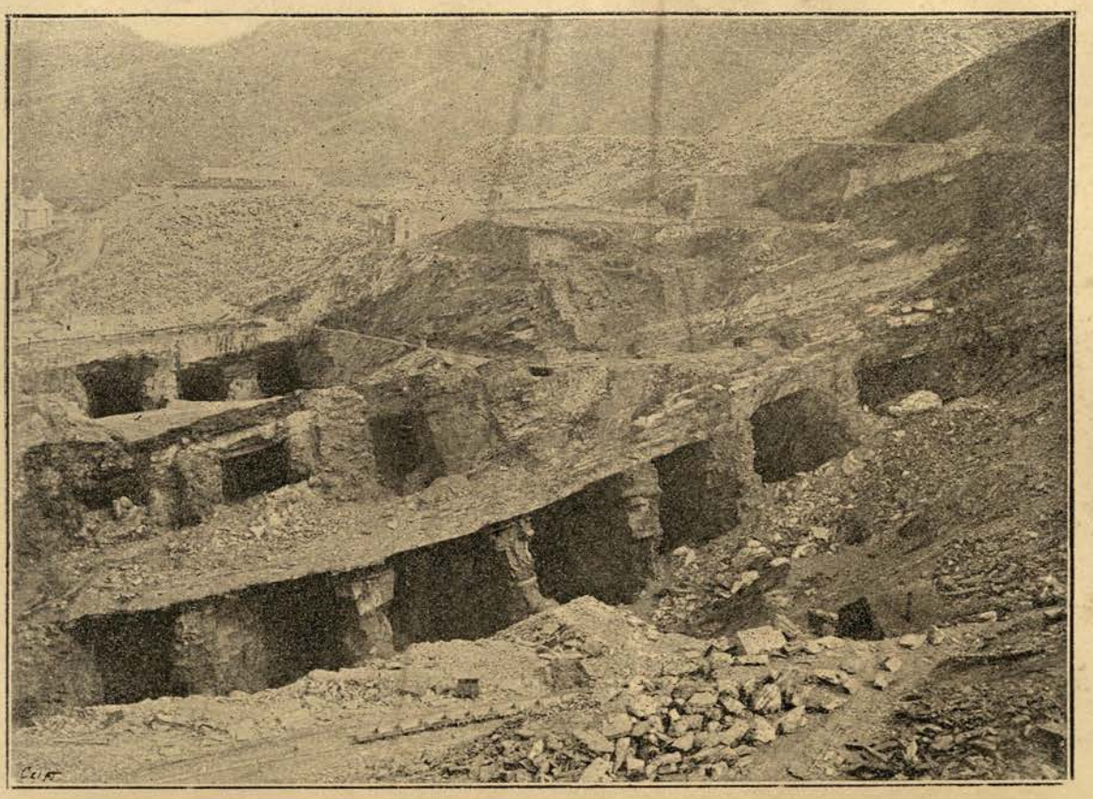


FIG. 7.—Part of Votty and Bowydd slate mine, showing the appearance of the chambers and supporting pillars as seen from the surface.

Three sets of workings upon parallel beds of slate are shown one above the other.

The straight line near the top left-hand corner indicates a long inclined plane for bringing down slate from another quarry.

Photographed by Mr. G. J. Williams.

FIG. 8.

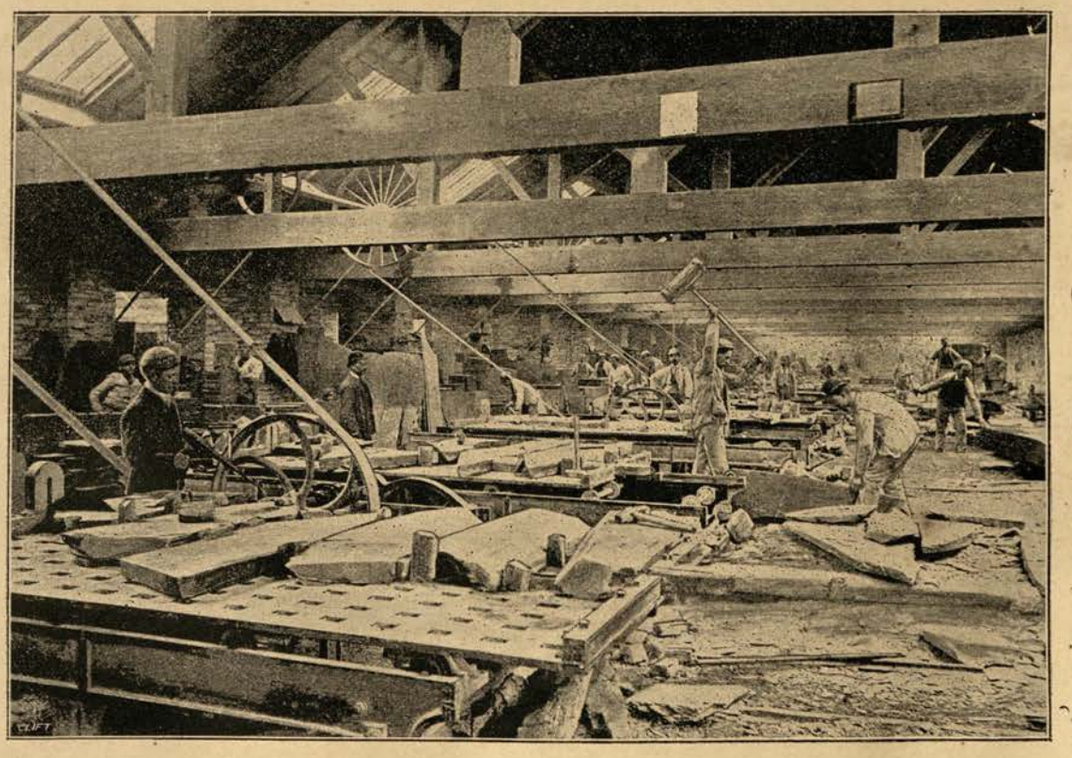
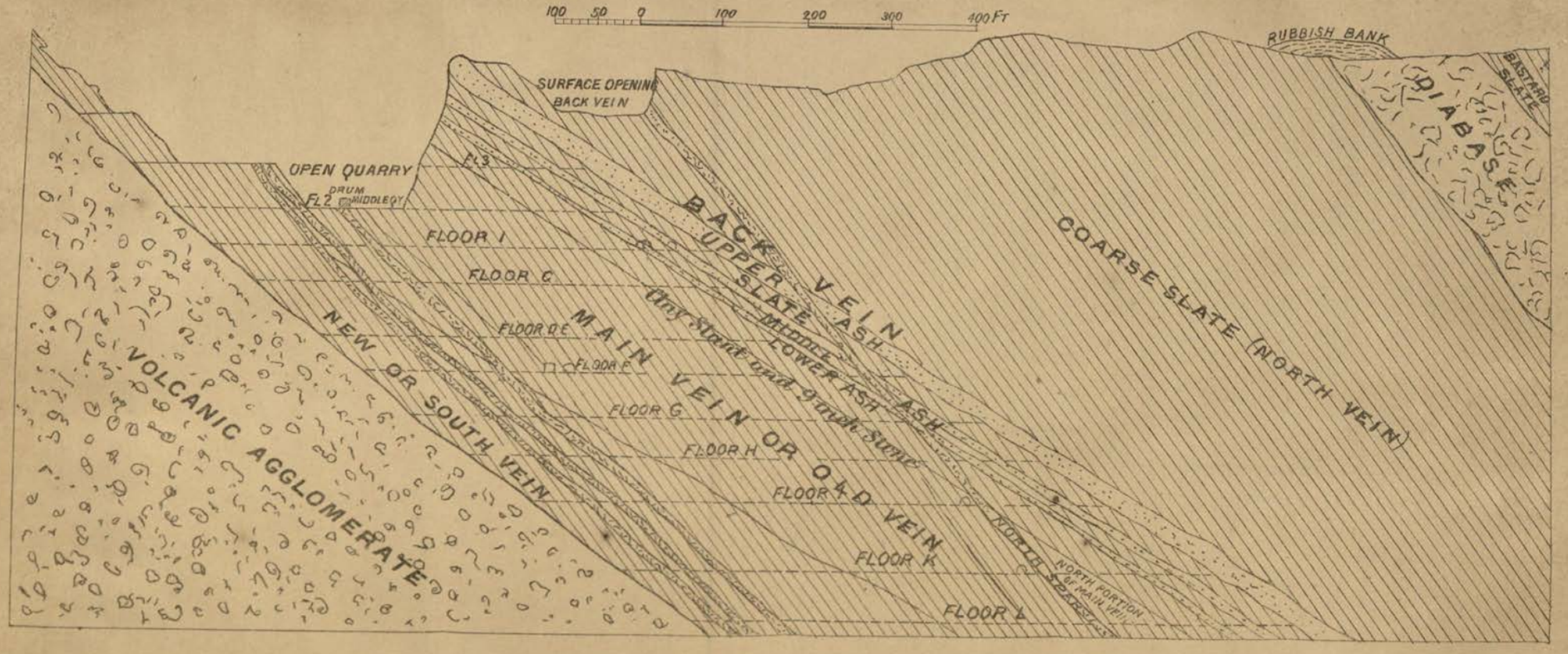


FIG. 8.—Mill at Llechwedd slate mine. The man using a hammer on the right-hand side of the picture is about to drive in a wedge and so split a large block of slate into slabs three or four inches thick. The man with the large mallet [*rhys, W.*] raised above his head is about to strike a blow on the edge of a slab and so break it across. The machines driven by belts are sawing-tables for cutting the slabs into lengths and giving an even edge for starting the splitting with the chisel.

Photographed by Mr. C. Warren Roberts.

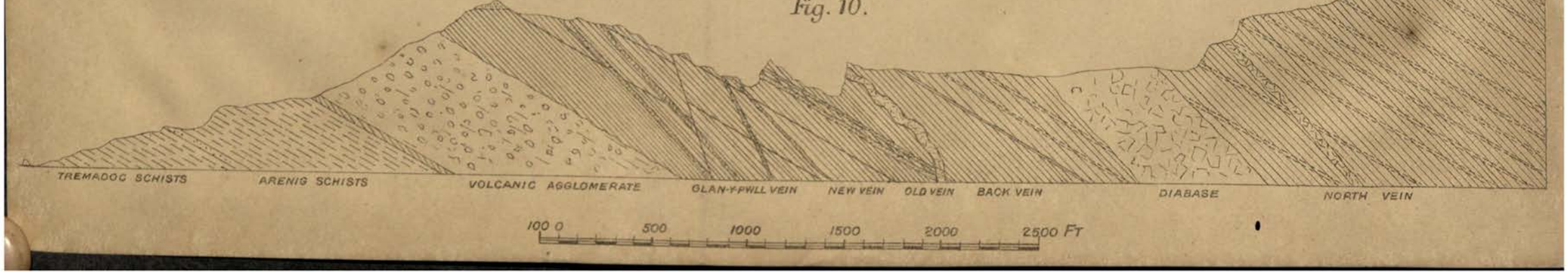
Plate V. *Fig. 9.*

SECTION ACROSS PART OF THE OAKELEY MINE



SECTION ACROSS PART OF THE OAKELEY MINE

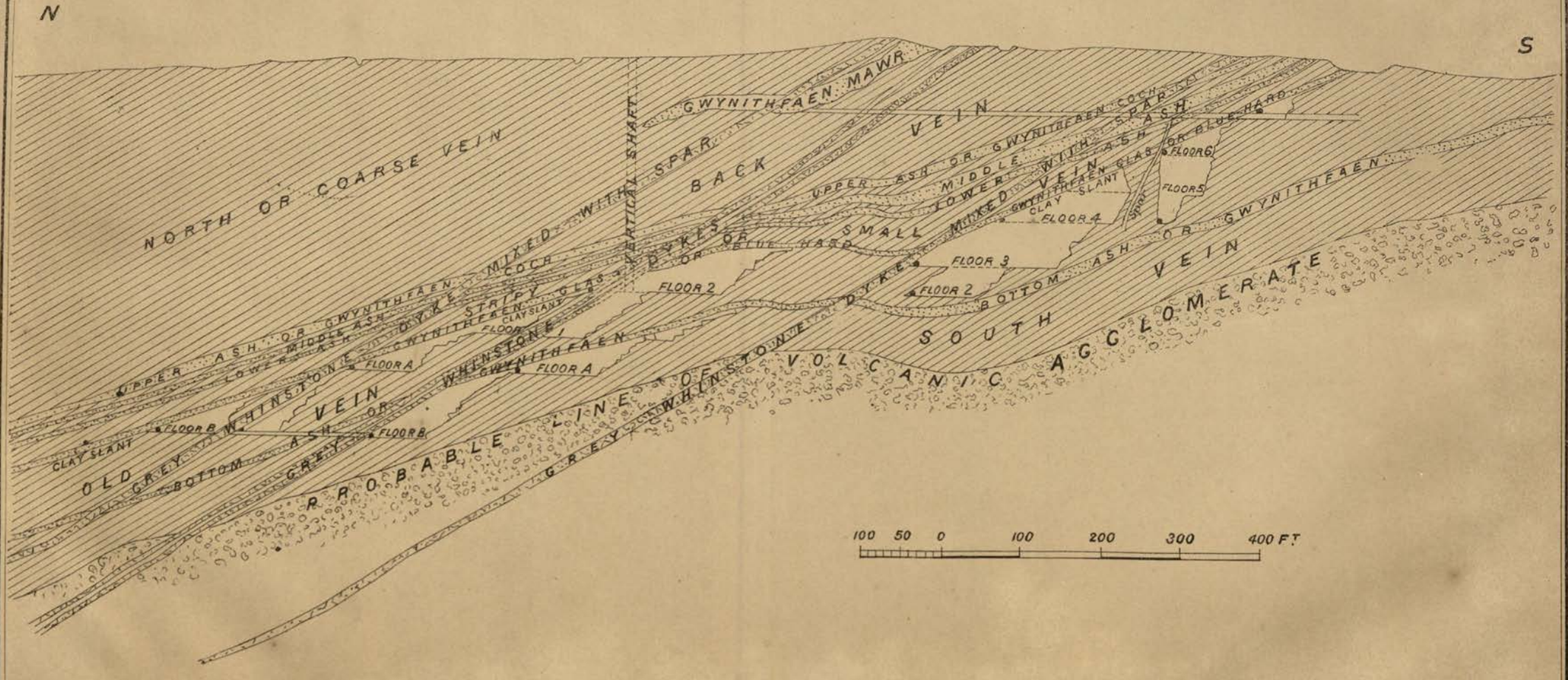
Fig. 10.



—SECTION ACROSS LLECHWEDD SLATE MINE.—

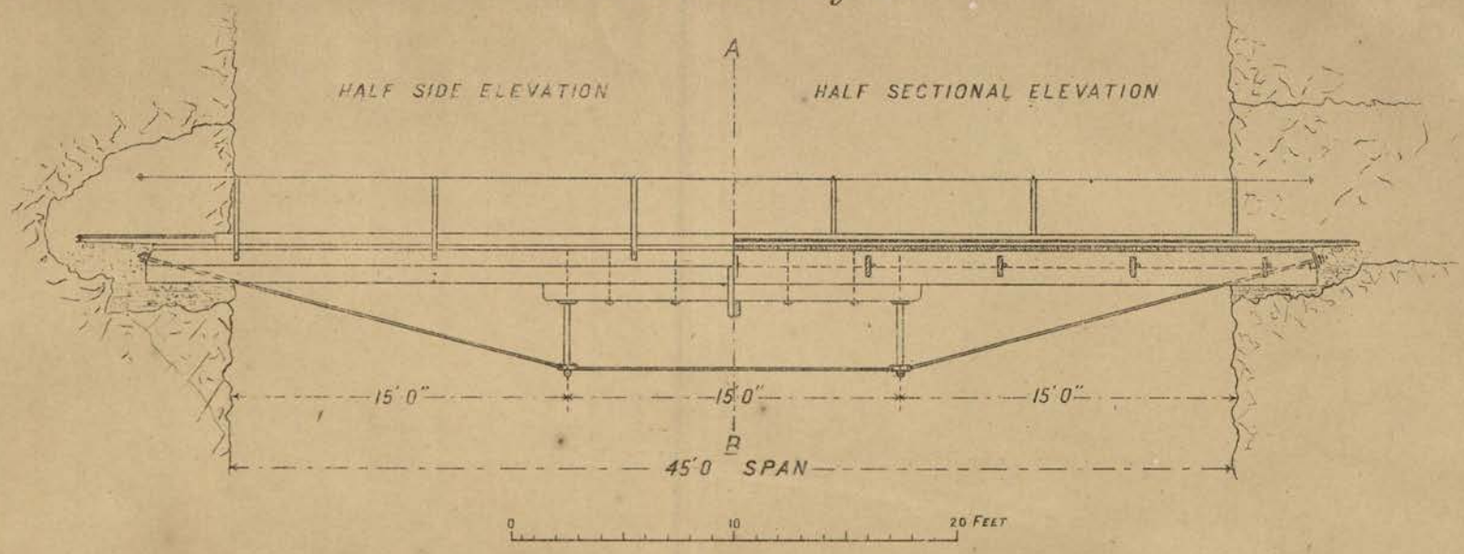
Plate VI.

Fig. 11.



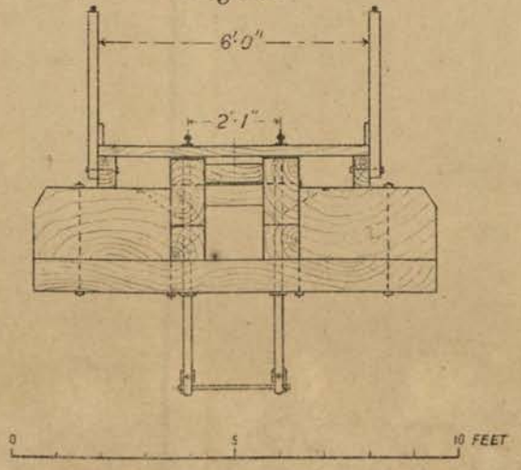
Wyman & Sons, Lt., Lith, 63, Carter Lane. 6739.12.94

Plate VII. Fig. 12.



SECTION THROUCH A. B.

Fig. 13.



Wyman & Sons, Lt. Lith. 63, Carter Lane. 6739. 12. 94.

Mr. Robert Roberts examined.

3012. (*Chairman.*) Where do you live?—At Groesffordd, Glanypwll.

3013. And what is your occupation?—I have been a rockman for the last few years.

3014. Where are you working now?—At the New Welsh Slate Quarry.

3015. For how many years have you worked there?—Three years to next June or July.

3016. And where did you work before that?—At the Oakeley quarries.

3017. I see you have written down several suggestions that you would like to make to us; would you kindly tell us what you have to say?—I have only a few general remarks to make with regard to what I have seen in the different quarries where I have been working. The first accident I remember seeing was a case where a crane fell upon a man because the bolt was not fastened at the top. The man was helping other men to work the crane. I would suggest that when men are working the cranes they should take particular notice how that bolt is before they begin to use the crane. With regard to crane accidents my experience is that they frequently occur because the men use pieces of wood under the blocks that are two thin and not strong enough; the result of using pieces of wood that are too weak is that when the men lower the blocks the wood breaks or slips, and the chain gives a jerk and the man is struck.

3018. Have you any suggestion to meet that class of accidents?—Proper pieces of wood of a certain thickness should be supplied to the men for the purpose, instead of their having, as at present, to use pieces of old sleepers which are very often rotten inside.

3019. (*Mr. Jones.*) What thickness would you recommend that those pieces of wood should be?—A piece of one of the old legs of the crane would do. There are plenty of those in some of the quarries, and they could be utilised without going to the expense of getting anything else.

3020. Is it within your knowledge that the old pieces of wood that you put under those blocks sink down into the ground?—Yes, they do.

3021. (*Mr. Jenkins.*) Do you mean the rollers that are put under the blocks by the "pieces of wood" that you have referred to?—Yes.

3022. And you suggest that the men should be provided with proper pieces of wood as rollers?—Yes, and that all the timber should not be cleaned away from the quarries so that there is nothing left for the men but old sleepers. They are only 3 or 4 inches thick, and when they sink a little into the ground there is no room to put the chain under the blocks.

3023. And they will not turn under the block?—No, they will not.

3024. (*Chairman.*) Have you anything else to say?—The handles of the crane should fit tightly and not be loose as they are in some cases.

3025. Do you mean that the handles should be fixed on permanently?—No, but they should be made a perfect fit. I worked at one time in place of another man where the handle was loose. The man in turning the handle was thrown over into the rubbish and he was injured. I also consider that trucks with only three cross-bars are dangerous for loading the blocks on.

3026. Do you suggest that there ought to be four cross-bars?—Yes, either four or two. Where there are three provided, the middle one should be taken away.

3027. (*Mr. Jones.*) Why do you suggest that the middle one should be removed?—When we put a chain on the block we try to fix it as near the middle as we can, and there is a tendency then for the chain to settle on the middle cross-bar, and when that is placed on the truck there is danger of it slipping.

3028. Is the cross-bar covered with a sheet of iron?—Yes.

3029. And that makes it slippery?—Yes.

3030. (*Mr. Evans.*) Are the bars across or lengthways?—There are three or four across.

3031. (*Chairman.*) Have you anything else to say?—I believe it would be advisable that there should be a rake to enable the men to clear under the block, so that men need not be under the necessity of using their feet and living afterwards without legs.

3032. Is it not a fact that there are rakes in some places at the present time?—I only know of very few.

3033. (*Mr. Jenkins.*) Who should provide these rakes in your opinion; is it not the duty of the men to provide them themselves?—It is every man's duty to look after his own life, and to consider how he can best perform his work without causing injury to himself. I have been working for 19 years underground, and so far I have not met with any accident. I have always been as careful as I possibly could.

3034. (*Mr. Evans.*) Do you provide a rake yourself?—I have one now, but it is one that I borrowed.

3035. Do you think it is the duty of the owners of the quarry to provide these rakes, or the duty of the men themselves?—I believe it is the duty of the men for their own safety and benefit.

3036. (*Mr. Jones.*) Should the rake go with the crane, or with the other tools?—With the crane, I should think. If I left the place I would not think of taking the rake away with me. I would leave it there with the crane, so that the man who came after me might have it.

3037. (*Mr. Jenkins.*) Therefore, he who provides the crane should provide the rake also?—I do not think one should be so particular as all that. The great thing is to get it.

3038. But upon whom would you place the responsibility of getting it, that is the question?—On the men who work with the crane.

3039. (*Chairman.*) Will you now tell us what you have to say about fuse?—I should like to know whether the man who supplies us with fuse cannot be put under the law, so that he can be made to supply us with proper fuse.

3040. Have you any complaints to make of the fuse that you get?—I have never been anywhere but that there were complaints about it.

3041. What fuse do you use?—They say it is made by the best makers. I forget the name.

3042. Is it a fuse with a double tape or a single tape?—It is fuse with single tape, but we have had all kinds of fuse. At certain times the fuse comes like a plague upon us—it is all bad fuse. The men are summoned before the magistrates in consequence of that; and what I should like to see would be the men who supply the fuse being made to appear before the magistrates at the same time.

3043. Why do the men have to appear before the magistrates in consequence of the bad fuse?—They go to the holes too soon to try to fire them again, and then they are summoned before the magistrates.

3044. They are summoned for re-opening the hole?—In the case of bad fuse, when the men light it, it may burn a short distance only, and then stop. Perhaps next time it may burn a little further.

3045. But why are the men summoned?—When we have good fuse we know that if the charge has not fired we ourselves are at fault, but when we have bad fuse we are apt to think that it has stopped burning, and we are tempted to go to it, whereas we would not go if it were good fuse.

3046. Do you think that the fuse suffers at all from being kept in a damp atmosphere?—Yes, a little, no doubt. It gets slower.

3047. And may it not fail altogether sometimes from that fact?—Yes, if it is kept long enough in a damp place.

3048. Then, may not the fault lie in the keeping of the fuse rather than in the fuse itself?—It cannot be a question of keeping it, because when the fuse comes out of the magazine at dinner time and all the men complain about it, when they worked right enough with the fuse they used before that, there must be something wrong with the fuse itself. It is under those circumstances that I want to have the makers of the fuse dealt with by the magistrates as well as the men.

3049. Then you have to complain that you have occasionally supplied to you bad lots of fuse?—Yes, it is pushed by the makers.

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3050. Forced upon the managers by the makers?—Yes.

3051. (*Mr. Jenkins.*) Are they taken in to be tried before they are bought?—I am not aware that they make any change in the makers. I believe that the firm which supplies the company with good fuse sometimes sends us bad fuse.

3052. So that it is not a case where bad fuse is taken because it is cheaper?—No, I do not say that.

3053. (*Mr. Jones.*) What do you pay for your fuse per coil?—I forget now what the price is.

3054. (*Mr. Evans.*) Do you always pay the same price for it?—Yes, the bad fuse costs the same as the good.

3055. (*Mr. Jones.*) You complain as to Rule 32, which states, "If a hole has apparently missed fire, no per-" son shall be allowed to go near it, except in a case " of emergency, until after the lapse of an hour at the " soonest." Is that you complain of?—Yes. What I say is that the men are tempted to break that rule because of the bad fuse that is supplied, whereas they would not be tempted to break it if the fuse were good. If the fuse could always be relied upon, the men would not think of going to the hole as they do now.

3056. (*Mr. Evans.*) Have you been complaining to the officials of the quarry about the supply of bad fuse?—Yes, I have. The complaints are like an epidemic—they spread through the quarry.

3057. And does the epidemic disappear after the complaints are made?—They go to some of the other quarries to borrow some good fuse until they get good fuse themselves. I believe they do all they can.

3058. (*Chairman.*) What is the next thing you have to tell us?—The men get candles which have such a bad smell that they cannot eat at dinner time.

3059. And what do those candles cost per pound?—They vary. At the Oakeleys they take them for a year at a fixed price. I have seen as much as 7*d.* per lb. being paid, and I have seen them being supplied at 3½*d.* or 3¾*d.*

3060. Who agrees on the price?—The company.

3061. Suppose the company supply bad candles, are you not allowed to buy your own candles and to use them?—Yes, but I feel that it is difficult for me to get good candles if the company fail. The bad candles are also dangerous to life. Evidence has been given before the Committee as to the distance at which we are allowed to place our candles when we re-charge. In these bad candles the grease collects in a pool at the top, and that bursts, with the result that sparks fly about in all directions. That is, of course, very dangerous where there is powder anywhere near, and it might very easily lead to an accident. As a rule we get good candles, but at times these poor candles make their appearance. I should like to see the people who supply these candles prevented from doing so, in some way, inasmuch as they are dangerous to life.

3062. What else have you to say?—I consider that one man should be set apart in every quarry to see that the ladders and ropes are kept in a good state of repair.

3063. (*Mr. Jenkins.*) Do you mean by that a man under the company?—Yes, a man who is not to take a bargain or any other work in the quarry. His duty should be to see that the ladders are safe, and he should be compelled to try them first of all himself, so that he may ascertain in that way whether or not they are safe for other men. I do not mean that a man should be kept entirely for that work and nothing else, but that he should not take any contract in the quarry, so that he may have plenty of time to attend to the ropes and the ladders.

3064. Do you mean the ropes and ladders used to inspect dangerous places?—Yes. When four or six men, more or less, have to use the ropes and the ladders, say this week, and afterwards put them by, and other men have to use them next week, the latter are unable to say what strain the ropes and ladders have had to undergo the previous week, and therefore they cannot properly say what condition they are in.

3065. Then your suggestion is that the same men should follow them always?—What I suggest is that there should be one man at least who would always be with them. The stronger of the two ropes, if there is one stronger than another, should be put to support the ladder, and the weaker should be used as a guy rope.

3066. (*Mr. Jones.*) Do you know that at the Oakeley quarries they always take a new rope every time they go up with the ladders, and if that is so, would that meet your views?—No, I do not think it would meet what I say, because I am referring to the ladders as well.

3067. But would it meet your views as to the ropes?—For my own part, I would trust a rope which had been used once quite as much as a new one, because it would have stretched what it would stretch.

3068. (*Mr. Jenkins.*) It would stretch under the strain?—Yes.

3069. And would it not be weaker by reason of that?—No.

3070. You think it would not be less reliable?—No. I have been at the Oakeley quarries when the same ropes were used two or three times with the ladders, and I considered they were quite safe.

3071. Do you raise very long ladders at your quarry?—I have been raising two in our quarry.

3072. Of what lengths?—Seven yards and 10 yards.

3073. That would make 17 yards?—It is not a high place.

3074. They would make 17 yards?—Yes, the two tied together.

3075. Would 17 yards be the longest you would have?—Yes, the longest I have seen was about 17 yards.

3076. (*Chairman.*) Have you anything else to say?—I consider that a man who works in a chamber where there is dangerous rock should be present with the man or men who inspect the chamber.

3077. (*Mr. Jenkins.*) Upon which of those men would you put the responsibility of making the place safe?—On the man who works in the chamber.

3078. And not on the man who usually removes the dangerous parts?—No.

3079. Therefore you put the responsibility on the least experienced man?—No man can know a place better than the man who works there.

3080. But to raise ladders and to work upon them is not the usual work of the man who works in the chamber?—A very inexperienced man may climb up to see what kind of a place he has to work in, considering that he has the rungs of the ladder to take hold of, and two hands and two feet to go up with.

3081. (*Mr. Evans.*) But there are many men who cannot go up a high ladder and stand there and work there, and yet those men may be good men on the face of the rock?—Yes, but there are many men who can climb to the top and tap the rock to see whether it is sound or not, although they may not be able to work on the top of the ladder.

3082. (*Mr. Jones.*) You mean to say that a man who is fit to work on the face of a rock ought to be able to go up to the top of a ladder to see the place, if it is necessary for him to do so?—Yes.

3083. (*Mr. Jenkins.*) Are you engaged as a rockman, or to remove the dangerous parts?—As a rockman.

3084. Do you sometimes work on the ladders?—Yes, I have been doing so at times, when I thought that my own place was dangerous, but I have never been to anybody else's place.

3085. Is it a fact that the pillars are worked in your quarry?—They say that some of the pillars come down themselves owing to the "bevels."

3086. Do you know that bargains are set to cut the pillars?—I know through being told by the man who works with me, and who is an old experienced man in the quarry, that there are some chambers in which the pillars come down of themselves, and men have been there working at the rock that comes down in that way, but it is very little that I know of the matter myself.

3087. What kind of a roof is there?—I have been looking up at it, and from its appearance it looks quite as safe as the ceiling of this room, but what it would turn out to be if one were to tap it and to test it I cannot say.

3088. Have you been working in a pillar yourself?—Yes, I have been cutting a piece of a pillar in the Oakeley Quarry. I was straightening it, and I commenced straightening one at the New Welsh Slate Quarry.

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3089. Was it you that went into the bargain after Richard Owen?—No, that was Griffith Roberts. That was before I went there.

3090. Was he a brother of yours?—No, he was not.

3091. (*Mr. Evans.*) Have you come here to represent any body of workmen, or do you represent yourself only?—I have read a little of what has appeared in the newspapers, and I understand it is rumoured outside that men are not very willing to come forward to give evidence from our quarry. I then decided to come forward. I do not value my employment so much as that, because if I cannot get work in one place I can get it in another, so that it comes to the same thing.

3092. But are you here as representing any body of workmen, or as representing yourself only, or someone else?—Mr. Owen, the manager, asked me whether I had heard that anyone was coming forward to give evidence from our quarry. I said there were rumours that the men at our quarry were afraid to give evidence before the Committee, and I asked him why he did not send someone here. He afterwards happened to pass by, and he asked me whether I had any objection to come, and I replied that I had none whatever.

3093. (*Mr. Jenkins.*) You have said that you read the newspapers a little; have you read the suggestions that have been put forward by the men in the course of this inquiry?—I heard some suggestions here to-day.

3094. And did you read the suggestions that were made by the men at the previous sittings?—Yes.

3095. Do you approve of those suggestions?—I am not able to go through them all now. I approve of some of the suggestions, but not of the others.

3096. Do you approve of the suggestion that a man be appointed in every quarry to see that the roofs and the sides of the pillars are made safe, and to examine such places minutely?—I should recommend that the agents or Dr. Foster should fine anyone who has left anything dangerous in the sides of the pillars.

3097. But how would you know that a thing is left unless you examine the place, or some man under the company did so?—There are the joints and so on, and it is not easy to judge whether they are the work of man or the work of the Almighty at the Creation.

3098. What about raising ladders to find out whether the place is safe or not?—In some places, where there is any doubt about it, it would be very advisable to raise ladders. I worked at one place in the Oakeleys, where lumps came down continually. They raised a ladder to examine the place, but they could not detect anything, and it seemed quite safe. A pillar which seemed quite safe and solid came down, whilst another pillar close by which was thought to be quite rotten, remains to the present day. There is a good deal of mystery in these matters. I should like to say that, as a matter of fact, I have had every facility and opportunity given to me at the Oakeleys and the New Welsh Slate Quarry to examine everything that I thought was dangerous.

3099. Do you think that things are left by the men sometimes, in consequence of their own negligence?—Yes, I believe that is the case sometimes.

3100. And you do not believe that it is the duty of the managers to see that that is not done?—Yes, it is, as far as they can.

3101. Another suggestion which was made, was to the effect that walls should be erected in all disused levels instead of fencing, as at present; do you approve of that?—I have seen walls erected in that way at the Oakeleys, and the men pulled them down afterwards. I take that to imply that the men do not approve of the walls, and that they prefer the fencing.

3102. But could they not be prevented from pulling them down?—It would be a very difficult thing, I am afraid.

Mr. J. Jones.

Mr. John Jones examined.

3103. (*Chairman.*) You are a rockman?—Yes.

3104. Where do you live?—At Brynhyfryd, Croesor.

3105. How long have you been a rockman?—For about 33 years.

3106. You are employed at the New Welsh Slate Quarry?—Yes.

3107. And how long have you been there?—I have worked altogether about 20 years.

3108. At the New Welsh Slate Quarry?—Yes.

3109. You have said in your letter that you would tell us what you consider is the best way of preventing accidents?—Yes.

3110. Would you kindly do so?—I think a great many accidents occur owing to the carelessness of the men themselves. I shall be glad to answer any questions. A great many accidents also happen owing to those who work on the rock being unskilful.

3111. Can you suggest any means of preventing these accidents?—Experienced men who work on the rock leave things undone, and allow others who are inexperienced to go up the rock to examine them, whereas the experienced men ought to do that kind of work themselves.

3112. Have you anything else to tell us?—There are a great many things connected with those. I consider it is our own fault if we leave dangerous things in the pillars. When we take a bargain we ought to consider the interests of the master and our own safety, and also the safety of those who come to work after us.

3113. (*Mr. Evans.*) Have you any suggestion to make to us about the working of the rocks in general?—My belief is that there are not sufficient men of experience employed to work there. The employers are often too lenient, and they give work to men who are inexperienced, or who have had but little experience in the work of cutting the rock.

3114. What do you mean by an "experienced" man?—During all the years that I have been working I have not met with any accident, nor has anyone who was working with me. I always take every possible care in every part of the work. When they go to blast I see to it myself, and if there is any suspicion that there is anything dangerous in the rock, I attend to it personally, I do not leave it to anyone else, unless he is a thoroughly experienced man.

3115. What time do you think it will take an ordinary workman to become a practical rockman?—It will take years.

3116. But how many years?—Of course, some men learn much quicker than others.

3117. But I spoke of an "ordinary" workmen?—I should think it will take him three or four or five years perhaps. I have been at it long enough, and I am learning even now.

3118. You do not consider that any man should have charge of a bargain unless he has had at least four or five years' experience?—Of course there are exceptions. Some men are of no use even after they have had five years' experience, so that it is impossible to draw a hard and fast line.

3119. Such a man as that may never become experienced?—Yes, that is so. He may never become capable of pulling down a rock, and to have a rock entrusted to him. Other men, on the other hand, will become experienced in less time than that.

3120. (*Mr. Jenkins.*) Have you seen the suggestions put forward by the committee of workmen before this Committee?—No, I have not read them.

3121. Would you approve of a man being appointed by the owners to inspect the sides of pillars?—They can do as they like as to that, but I consider it is my duty to see that everything is safe in the place where I am working. The agent may come by and look at it, but as he has to look at it from a distance he cannot tell very well, and I think it is my duty to see to it.

3122. The suggestion was that the place should be examined thoroughly by a man under the company—that the sides of the pillars should be inspected minutely—would you approve of that?—Yes, I would approve of it, but for my own part I do not see that there is anything special calling for it. It is only what a prudent agent would do now.

3123. Is it within your experience that the manager goes to a place at present and tests it with the hammer?—No, it is not, but I have seen Mr. Andreas Roberts do that. He used to go to the rocks to test them.

3124. That was only done occasionally?—Yes, he used to do it when he came to let the bargains.

3125. Do you think it would be an improvement to have a man to see that every place, before it gets out of reach, is left in a proper state?—It would, if there is

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anything left which would endanger the men who work there afterwards; but I do not see the necessity for it when the agent asks the man who works there, who is a practical man, whether there is any danger. He should report it.

3126. Is it not a fact within your knowledge that practical men do not always do their duty in that respect?—They are not honest men if they neglect that duty. If there are men of that class, they are deceivers.

3127. Would you put upon someone the responsibility of seeing that these men do their duty in order to guard against accidents in time to come?—I have nothing to say against that.

3128. Would you approve of a periodical inspection being made over the whole of the quarry?—I think it is impossible to do that, unless a man possessed wings.

3129. And you are not in favour of suggesting anything impracticable?—No.

3130. You say it is impracticable to inspect the whole of the quarry periodically?—Yes, it is, unless there has been a fall, or something has come down.

3131. Then if something comes down you would inspect it thoroughly?—Yes, and I have never yet seen an agent who would not do that after anything of the kind, if he were told of it.

3132. Is there sometimes a tendency on the part of the men not to inform the manager or agent when something comes down?—I am not aware. I may say that if I knew of anything I would inform them of it at once. It is very easy for them to go and see if there is anything coming down. Perhaps we as workmen do not always do our duty in that respect.

3133. For how many hours do you work underground?—From bell to bell.

3134. And how long is that?—In the summer it means from 7 in the morning to 5.30 in the evening.

3135. And do you go out for dinner?—Yes.

3136. So that would be 10 hours?—Yes.

3137. And how much is it in the winter?—From 7.45 to about 5, just as the day happens to be.

3138. Your whistle blows in the morning at 7.45 just now?—Yes, or earlier, as the day gets longer.

3139. Therefore you do not follow the whistles at this side?—It is too dark sometimes when the whistle goes, and no one can work unless he takes a candle.

3140. So that really you follow the day?—Yes.

3141. Taking the year all round, and especially in the summer time, do you consider the working hours too long or too short?—I very often find the day too short for me to do the work I want to do. My great object is to get money for doing the work.

3142. What do you think is the effect of long hours underground on the health of the workman?—I do not know. I believe I am very healthy myself, and I have always been so.

3143. Do you see much daylight at this time of the year?—No, I do not see any scarcely, except a little about Sunday.

3144. Therefore you practically live underground?—Yes, I am there most of my time.

3145. And in the dark?—Yes.

Mr. D. W. Jones.

Mr. David W. Jones examined.

3146. (*Chairman.*) Where do you live?—At Maesgwyn, Penrhyndeudraeth.

3147. And you are a rockman?—Yes.

3148. How long have you been a rockman?—I have been working at the Cwmorthin Quarry. I have been away from there off and on, but I have been there altogether for about 26 years. For the last 13 years I have been there continuously without leaving.

3149. Will you give us your experience with regard to the possibility of preventing accidents; can you offer any suggestions as to the preventing of accidents, or improving the health of the men?—I thought of referring to one matter, but it has been nearly exhausted by the previous witnesses. The cranes are what I wanted to refer to.

3150. How would you suggest that they should be improved?—There is one thing that has not been referred to, and that is the desirability of preventing the crane from striking the man who is at the handle. I do not know how that can be managed.

3151. Do you find, as a rule, that this happens when the block is being lowered?—Yes, I know of one case in our quarry, but I do not remember the month or the year that it took place. A piece of wood was placed edgeways under a block, and when the block was put on it the wood turned, and the crane gave a jerk and struck the man, and he died in consequence.

3152. How long ago was that?—I forget the year.

3153. What was the name of the man?—Robert Davies.

3154. That was in 1875. His skull was fractured by being struck with the handle of a crane, and he died nine days after the accident?—Yes, that is the case I am referring to.

3155. Have you anything else to tell us about the cranes?—I am of a different opinion to the previous witness respecting the pieces of wood to put under the blocks. I would prefer them square rather than round. We have to lift the block up a little bit, and there may be a tendency in a round roller to give way with the block.

3156. So you prefer a square block of wood to a roller?—Yes.

3157. What else have you to say?—Another matter that I should like to refer to is the prevalent opinion that the Cwmorthin Quarry is more dangerous than other quarries.

3158. (*Mr. Jenkins.*) Do you say that it is more dangerous than other quarries?—I think I would say that, as far as my knowledge of quarries goes, and as far as I have inquired.

3159. Would you attribute that to natural causes?—Yes, that is my opinion.

3160. And to nothing else?—I would not attribute it entirely to natural causes. In some cases accidents have taken place owing to a larger number of inexperienced men being taken on there than is the case at other quarries, and loose things may have been left in the rock above which might have fallen afterwards and caused accidents.

3161. In what part of the quarry do you work—do you know anything about the place that was mentioned here this afternoon, floor B., south sink?—No, I do not know anything about that. I am working far from it.

3162. Do you know that pillars are worked there?—I do not know minutely, so as to give fair evidence about it.

3163. What is your opinion; would you make a rule or a law to prevent pillars being cut beyond a certain limit?—They should not be cut below a certain limit, except where a chamber has been worked, or part of a quarry has been worked, and they do not intend to work again. In that case a portion of the pillar might be cut down, if they think it safe to do so, but not in any other case.

3164. So you would put that to depend on circumstances?—I believe that if, judging from circumstances, they think that a portion of a pillar might be cut, it might be done.

3165. To whom would you leave the deciding of that question?—To the man who intended working there.

3166. You would not allow the inspector of mines to have any hand in it?—No. I would rather trust my own practical experience than rely upon anybody else.

3167. But to whom would you leave the responsibility of deciding whether a pillar, or part of a pillar, could be cut away?—I think the man who is to work there would be the most likely person to know how much of the pillar to cut.

3168. Does not cutting the pillar weaken the top?—Yes, it does, and I do not believe in cutting them down except when that part of the quarry has been worked out. If a man thinks two yards can be cut off, then it might be done.

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3169. Have you been working in coal mines?—Yes.

3170. They are worked under more stringent rules than slate quarries, are they not?—Yes, they are, but in coal mines they take all the coal away and leave no pillars.

3171. But there are frequent sources of danger there?—Yes, from fire-damp, and so on.

3172. Would you make the rules in slate quarries similar in stringency to the rules in coal mines?—Yes, with this exception: that the man who is best able to know of things in a slate quarry is the man who works in the place. It is different to a coal mine in that respect. Anyone used to coal mines can tell in the coal mine when there is gas there, but in the slate quarry an experienced man who works in the chamber would be the most likely man to know all about that chamber.

3173. Do you know that the principle that runs through the Coal Mines Act and the Metalliferous Mines Act is that the responsibility rests with the owners?—Yes, if they neglect to do anything which pertains to them.

3174. Are they held responsible for the enforcement of all the rules and the requirements of the Act?—Yes, they are.

3175. And do you approve of that?—Yes, and the same with regard to the quarries. If we do anything that is not right, I think we ought to be properly looked after and made to keep the regulations as strictly as possible.

3176. Which do you think is the healthiest to the men who work there—a coal mine or a slate mine?—It is difficult for me to give a definite opinion on that point. I only worked for five or six years in a coal mine.

3177. In which of the two do most accidents occur?—I cannot say. I have not looked at the statistics.

3178. (*Mr. Evans.*) As to the cranes, you said there should be something to stop the cranes when men are absent-minded, to prevent accidents happening; what would you recommend?—As I am not an inventor, I cannot suggest anything in that direction.

3179. Have you seen any cranes with what is called a "ratchet-wheel" upon them, which stops them within an inch or an inch and a half?—Yes, I worked with a winch which had a pawl to prevent it turning back.

3180. Do you think that something of that kind would work on the quarry cranes?—Yes, I believe it would. Three men have been killed at the Cwmorthin Quarry within the last 10 or 12 years from accidents with the cranes.

3181. Did these accidents occur when the crane was stopping or winding or lowering?—One of them happened in lowering, and another in winding. I do not remember now what was the cause of the third.

3182. Do you think that the accident that happened in winding the crane could have been prevented if the crane had been supplied with a pawl?—Yes, I believe it could have been avoided in that way. If anything could be invented to follow the cog-wheels as they turn it would be very useful.

3183. You consider it an important question, and that the Committee should be pressed to recommend something of that kind?—Yes, I would strongly recommend that something of the kind should be supplied if possible, as many accidents of the kind have occurred which have not been fatal.

3184. (*Mr. Jenkins.*) Have you seen cranes with worms on them at all?—No; I have not.

3185. Therefore your cannot say whether the men will take to them or not?—No; I cannot say; but I would like to see some improvement brought about in that respect.

3186. What is your opinion about the length of the working day underground?—It is rather long at present, in my opinion.

3187. Would you prefer shorter hours?—Yes, indeed; a little.

3188. And do you think that is the general opinion of the workmen?—I cannot say that; but as far as my experience goes I am tired half-an-hour or more before the time for leaving off, if I have been working very hard.

3189. (*Mr. Evans.*) What do you consider the length of the working day should be?—If we could reduce it by an hour a day it would be a great improvement.

3190. And what would it be then?—It would be nine hours then.

3191. You include the dinner hour in that?—I would like to reduce it to nine hours, and that to include the dinner hour.

3192. (*Mr. Jenkins.*) So that practically you advocate an eight hours' day?—Hardly; if that means working eight hours on a Saturday.

3193. (*Mr. Jones.*) Do you mean that you hardly approve of it if it is to be an eight hours' day all the year round or what do you mean?—I would rather shorten it to nine hours a day; but that we should work on Saturdays for the same time as at present.

3194. (*Mr. Jenkins.*) But you would approve of 48 hours a week?—That depends on how they would be divided; I do not at all approve of working eight hours on a Saturday.

3195. Are the chambers worked through from the clay-slant to the "hard"?—Yes, sometimes.

3196. Do you know of any chambers that are not worked so?—There are many which they have only worked for one, two, or three thicknesses.

3197. And then they stop?—Yes.

3198. Have they re-opened in another part of the vein?—I do not know of any.

3199. Do you know of any chambers opened in the middle of the vein?—There are some which were opened a long time ago, but they have stopped working them now for some time, with the exception of one.

3200. What were the roofs in those cases?—A whinstone dyke.

3201. But you do not know of any with a slate roof?—Yes, there are some of that kind, where there are faults, but those are narrower by 2 or 4 yards.

3202. Are those less safe than the others?—Yes, they are.

3203. (*Mr. Evans.*) Are you working in one of those yourself?—No, I am not.

3204. Have you been working in them at all?—No, I have not, except perhaps for a day or two now and again instead of somebody else.

Mr. Evan Hughes examined.

Mr. E. Hughes.

3205. (*Chairman.*) Where do you live?—At 5, Walter Terrace.

3206. Are you a miner?—Yes.

3207. And how long have you been a miner?—For about 25 years.

3208. Where have you worked principally as a miner?—At the Maenofferen Quarry mostly. I have been there now for 18 years without leaving there.

3209. What suggestions do you want to make to the Committee?—For one thing, I should like to be allowed to have more powder than we are able to get at present.

3210. Has the manager of your quarry ever applied for an exemption?—I do not know that he has.

3211. Have you ever asked him to apply for an exemption?—We asked him to allow us to take more powder, but he said he could not do so as things were then.

3212. But if you are working as a miner do you require very large quantities of powder or do you require as much powder as a rockman?—Sometimes there are two of us working and sometimes four, and we can only get 4 lbs. of powder from the magazine and that is not enough for us to go on with our work.

3213. But why do not you each take down one canister of powder?—We are not allowed to have them. We are only allowed to take 4 lbs. Sometimes we work at night and have only 4 lbs of powder, and very often we put 1 lb of powder in a hole and it will not blast and we have to charge it again, and then we will not have powder enough to go on with our work.

3214. (*Mr. Jenkins.*) Would you have any objection to go under the special rules which are in force at the

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Oakeley, Llechwedd, and Cwmorthin quarries?—No, none whatever.

3215. (*Chairman.*) Is there anything else that you have to say?—We as miners never use anything but wooden stampers.

3216. (*Mr. Jones.*) What explosives do you use?—Gelatine and dynamite.

3217. (*Mr. Jenkins.*) Are we to understand that 4 lbs. of gelatine is too small a quantity?—Yes, it is. On many occasions we ought to have 8 lbs. or 12 lbs.

3218. Would you use that quantity in one stem?—Yes, on many occasions I could have used that quantity and used more than that even.

3219. (*Mr. Jones.*) I suppose that would depend on the number of men you have in the gang?—Yes, and in cases where we have to remove something from overhead.

3220. (*Mr. Jenkins.*) You miners never use gunpowder there?—No, we do not. I believe it is much safer to have the powder in 25 lbs. or 50 lbs. kegs in the magazine than to supply it in the bugles as at present.

3221. (*Chairman.*) Have you anything else to say?—I think I ought to say a word about the removing of dangerous parts from the roof, as I have been engaged in that work during the last five years more than any other man in the quarry. If there is anything dangerous in that way we are informed of it, and I am sent there with other men for the purpose of removing it.

3222. Do you think the present system in that respect is sufficient?—Yes, I believe it is, so far as it goes. I do not think that miners, as a rule, ought to be removing these dangerous things, but that the men who work the chambers should be there as eye-witnesses, so that they may see what is left there.

3223. Are they not present when you do this work?—No, not always.

3224. Are they generally there?—Yes, they are, very often.

3225. Why are they not there always?—I cannot say anything about that. Perhaps it is because they do not like to go to the work. They know it has to be done as well as the men who have to do it.

3226. Do you mean that they do not like to go up the ladders?—Many of them cannot go up, but there are others who can go, but they will not do so. They prefer to keep clear of the place.

3227. (*Mr. Jenkins.*) Is it the rule that this sort of work is entrusted to the miners in your quarry?—Yes, most frequently.

3228. Do you think they are more capable of doing that work than the rockmen are?—No, I do not think they are. I believe a rockman can do it quite as well as a miner. The rockman is quite as experienced in sounding the rock as a miner is.

3229. And is he not more experienced in climbing?—Yes, with chains he is.

3230. And with ropes as well?—Yes.

3231. What is your mode of carrying out the operation of removing loose parts of the rock?—We get a light, and go about the thing as well as we can before raising a ladder.

3232. What kind of a light do you use?—Paraffin on cotton waste.

3233. You make a kind of a torch?—Yes. We have a rod about four yards long, and we fix it at the top of that.

3234. Can you see to a good height with that light?—Yes, from 12 to 13 yards.

3235. (*Chairman.*) Do you think that is as good as the Wells light?—I have never used the Wells light, and I cannot therefore say anything about it.

3236. (*Mr. Jenkins.*) But you have seen it?—I have seen a lamp at our quarry with something like the electric light.

3237. (*Chairman.*) Was it a lamp with magnesium ribbon?—Yes.

3238. With a reflector?—Yes.

3239. So that would not be a Wells light?—I do not know what they called it.

3240. (*Mr. Jenkins.*) How long did that last—the light that you saw?—It did not work well then. It lasted for 5 or 10 minutes or so.

3241. Would it not be preferable to have a strong light to continue permanently?—Yes, it would be much better.

3242. How long are the ladders that you raise in your quarry?—We have not been raising long ones in our quarry, perhaps about 13 yards.

3243. Your quarry is not a very dangerous one, I suppose?—No, I do not think it is. The best thing that can be done with chambers is to work them carefully while the rock is under one's feet.

3244. When you were inspecting pillars in that way, did you find much loose rock which had been left there owing to the negligence of the workmen?—In some cases I have seen things left which ought to have been removed.

3245. And you could not find the offender?—I do not know whether he could have been detected at that time or not.

3246. It might have been left there for a long time?—Perhaps.

3247. And have you any suggestion to make with the view to putting a stop to that sort of thing?—Yes, I would suggest that the pillar should be seen to. There is a great difference in that respect between different men. Some men leave them so that there are no loose pieces about.

3248. Would you like to have some means of compelling every man to do that, to cut the pillars clean?—As far as I am aware, they do that at our quarry, and they are warned by the agents to do so.

3249. Are any steps taken at your quarry to see whether the men do that or not?—I believe they look at it pretty often.

3250. From where do they look, from the bottom of the chamber?—If it is not too high.

3251. No other means are used?—I know of no other means, but if something happens to fall down from a pillar they raise ladders there.

3252. Would you approve of periodical inspections being made, whether things fall down or not?—It depends on how you have left the place; if you have any suspicion about it, it ought to be examined, I should say.

3253. Are you of opinion that a record ought to be kept of what condition it is left in?—Yes, I am. I consider that there should be an inspector under Dr. Foster, as his district is so extensive, and he cannot come here often in consequence of that. The sub-inspector ought to be a man who has the name of each floor, and the number of each chamber in the floor, so that he may visit each place often.

3254. Supposing that no inspector could do the work you are suggesting now, would you require the management to appoint a man to do it?—Yes.

3255. It is your strong belief that much of what falls from the sides of the pillars is due to the negligence of the men, and that if they were worked properly much of that might be avoided?—I believe that that is true in many cases.

3256. (*Mr. Jones.*) With regard to your suggestion as to an inspector, you have told us that you are yourself engaged upon this kind of work, taking down dangerous things?—Yes.

3257. If another man were appointed to look after those things, would you be more inclined to obey his orders than you are to obey the orders of your present masters?—I would have to obey, if he was an experienced man.

3258. But is it not so now, are you not obliged to obey at present?—Yes, we obey the rules as far as we can.

3259. You have had charge of this work of removing dangerous things for the last five years?—Yes.

3260. Supposing you had kept notes of the work you have done every day during those five years, would not that be a sufficient record of the state of the bargains such as you suggest the inspector should keep in a book?—Yes, it would just amount to the same thing.

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3261. (*Mr. Jenkins.*) Would that include the whole of the quarry?—No, it would only include the places where I had been.

3262. And you want a record to be kept of every place in the quarry?—Yes, a record of the places that you have any doubt about them.

3263. What you complain of is that no means are taken to enforce this provision of compelling every man to see that the sides are safe?—Yes. If there was a man of that kind he could take that work up.

3264. (*Mr. Jones.*) If you were to appoint an assistant inspector under the Government, and got a satisfactory report from him upon a chamber or roof, and next day an accident happened in that very place, upon whom would you fix the responsibility for that accident?—I cannot answer that question. Things happen in a quarry and you do not know upon whom the responsibility rests.

3265. Would you not be introducing three different parties to be responsible for one accident?—No, I do not think so.

3266. (*Mr. Jenkins.*) You do not want to lessen the responsibility of the workman himself?—No, I do not. I want the responsibility to rest upon the workman as well as the master.

3267. But if an accident did occur after the servant of the company has approved of the place the responsibility in that case would rest with the employers?—Yes.

3268. Is that the spirit of the present Act of Parliament?—Yes, it is.

3269. And is it a sound principle?—I cannot say anything about that. I ought to say that at the disused levels in our quarry they erect walls instead of fencing.

3270. (*Chairman.*) Right up to the top?—No, not quite up to the top.

3271. (*Mr. Jenkins.*) Would you recommend them to be built right up to the top?—No, I do not think so; because as they are now there is room for the smoke to leave the chambers.

3272. What led to the suggestion as to the erection of walls was the question of preventing lumps being thrown by blasts from one chamber to another; would the walls you have described answer that purpose, do you think?—I believe there is more than that in view. They may answer that purpose, but if a stranger came to the quarry and there was no wall he might go straight over the edge, but a wall would prevent that.

3273. (*Chairman.*) Have you anything else to say?—At our quarry, where the water comes through the cracks, and is in danger of injuring the pillars, there are dams put there to prevent the water as much as possible from going that way.

3274. (*Mr. Jenkins.*) Is there any attempt made to prevent the water from running over the face of the rock at your quarry?—Yes, there is.

3275. So that the rocks in your quarry are dry?—No, not perfectly.

3276. Could it be done always, do you think?—Yes.

3277. (*Mr. Evans.*) I see that the per-centage of fatal accidents at the Macnofferen Quarry is very low?—Yes, I believe it is.

3278. Do you attribute that to the care taken in the management of the quarry, or to the nature of the rock?—I believe it is partly due to both.

Mr. David Jones examined.

Mr. D. Jones.

3279. (*Chairman.*) Where do you live?—At 118, Manod Road.

3280. Are you a rockman?—Yes.

3281. How long have you been a rockman?—For 32 years.

3282. And at what quarries have you worked?—I have been in a great many in this district.

3283. Have you worked in most of the quarries in the Festiniog district?—Yes, I have.

3284. What do you want to suggest to us?—What I intended to refer to specially was the mode of supplying the powder.

3285. You were here, I suppose, when Evan Hughes gave his evidence?—Yes.

3286. Have you anything different to tell us to what he said?—I believe he gave his evidence specially with regard to dynamite, but I would like to refer to gunpowder.

3287. He spoke about both, I think?—I consider that we are under a great disadvantage, and exposed to dangers in the way it is given out to us.

3288. Would you like to have your powder in the same way as the men at the Oakeley, Llechwedd, and Cwmorthin quarries get it?—Yes.

3289. Has your manager ever asked to be allowed to have it so?—I believe he has asked, but I am not certain.

3290. What next have you tell us?—The next thing is with regard to the inspection; I consider that the present Government inspection tends to create fear rather than efficiency.

3291. Will you explain what you mean by that?—After an accident has happened many go to the place to inspect it, and it can often be seen that an accident has happened which could have been avoided, but the tendency is to hide a great many things in connexion with these accidents which ought to be brought to light.

3292. Who hides those things?—The workmen.

3293. And why do they hide them?—I believe there are reasons why they do so. When a serious accident happens, it is evident there is fault somewhere, but we do not find out where the fault is, or at any rate we do not like to accuse anyone where it is only a case of suspicion.

3294. In the case of the last fatal accident at Maenofferen, was not the fault found, and was not the manager punished?—I am not aware of that for certain, and I did not intend to refer to any particular case, but I know that is the tendency.

3295. But do you know that the manager was prosecuted in the case I refer to?—Yes.

3296. And do you know that he was fined? Yes. The man takes a bargain, and he wants to make as much wages as he can out of it, and, on the other hand, the employer wants to make as much as he possibly can out of it. When an accident happens, a third party comes in and prosecutes. What I should very much like would be that that party should be responsible the same as we are, and that he should know the place.

3297. Have you any other suggestion?—No, I do not think I have anything special.

3298. (*Mr. Evans.*) What effect had the fining of the manager upon him; did he become a better man, or more careful?—I am not aware that it had any effect upon him. I believe he was at the time performing work which it was absolutely necessary to do, and he was fined in consequence. I believe we have one of the most careful and conscientious managers. I think there is a great deal to complain of in the way we get the reports of these cases: Reports that appear in the newspapers are not always full or accurate, and neither the manager nor the workman gets fair play in consequence.

3299. With reference to the case of the manager, you said the work the man was doing was absolutely necessary; was it necessary that he should be working upon the incline during the day when traffic was being carried on?—I did not refer to that, but to the work that the manager did afterwards, and he was called to account for doing what was necessary. At least I considered it was necessary.

3300. What was the work?—If I understand the matter properly, I believe there were caps which had been dropped in the place, and they were found afterwards and had to be cleared. The manager was prosecuted when he was clearing those caps, and his object in doing so was to prevent an accident. That is how it was reported to us, at any rate.

3301. That is the first I have heard about any detonators; the man was working in the daytime when he should have been working at night?—I did not think of referring to any particular case in that way. I should like to refer to inquests and to the calling of witnesses. I find that men are not summoned who know better about the circumstances of the accident than those who

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are summoned, but if those men possibly can they escape being summoned.

3302. Is not the summoning of witnesses in the hands of the coroner and the police?—I do not know exactly how it is done. We also feel that men are called on the jury who do not know the nature of the work of a quarryman, and in consequence of that they are not able to put suitable questions to the witnesses.

3303. Would you be satisfied if the coroner gave orders that half the jury should be men who are quarrymen, or who work in the quarries?—I believe that would be an advantage.

3304. (*Mr. Jones.*) Is that not already done; is there not a change in that respect since this inquiry commenced?—I do not understand that anything has been done.

3305. (*Mr. Jenkins.*) I do not quite understand how the present inspection creates fear rather than efficiency; will you explain what you meant by that answer?—What I mean is that it is not to be got except when an accident has happened.

3306. You said also that the bargain-taker is held responsible in a case of that kind?—As he is an eye-witness he knows most about it.

3307. And if he supposes that he is responsible, he is not inclined to tell the truth, is that what you mean?—There is reason to believe that they are not, in many cases at any rate.

3308. You have also said that the proper witnesses are not called at inquests?—Yes.

3309. Do you believe there is a tendency on the part of anyone to keep back certain witnesses?—I am afraid that there are some men who keep themselves back.

3310. How can they do that; are they not summoned?—No, they are not. They are able to avoid being summoned in some way or other. They do not make it known who the men are who should come forward.

3311. Do you know that the proper witnesses, or the most important witnesses, are not called?—I do not know whether that is purposely intended.

3312. But is it so, as a fact?—Yes, it has happened in that way.

3313. And as the result of that are inquests to a certain extent a dead letter?—I am afraid it is so to a very great extent.

3314. (*Mr. Jones.*) Is it a dead letter?—I cannot say that that is the case altogether. In certain cases, where a man is responsible, he may be guilty of manslaughter, but no one is willing to come forward to give evidence against that man unless he is quite certain.

3315. (*Chairman.*) Would not that be the case at any inquest, whether it related to a mine or anything else?—I daresay it is the case generally, as far as that goes.

3316. (*Mr. Jenkins.*) If it were proved that there was no negligence, would it then be a case of manslaughter?—No, but there are cases when a man may be at fault, but not to such an extent as would amount to manslaughter, but as far as I and others understand the law at present, it amounts to manslaughter or nothing.

Mr. J. Parry.

Mr. JOHN PARRY examined.

3317. (*Chairman.*) Where do you live?—In Lord Street.

3318. And you work at the Oakeley Middle Quarry?—Yes.

3319. You are a slate-maker?—Yes.

3320. How long have you been working as a slate-maker?—For 17 or 18 years.

3321. What point do you want to bring before us?—One thing is that we are called to our work very early, and before it is light enough for us to work, especially during the winter months, when the weather is cold and damp, and, in my opinion, this must be detrimental to the health of the men.

3322. What time have you to be in the mill at the present time?—At 7.30.

3323. And at what time do you leave work in the evening?—Last week we left off at 4.45, but this week, I believe, it is 5 o'clock.

3324. You say you have to be at the mill at 7.30 in the morning?—Yes.

3325. And how soon are you able to begin work after that time?—We are not able to commence work until 8 or 8.15, just as the day happens to be.

3326. Then you are half an hour or three quarters of an hour in the mill doing nothing?—Yes, simply waiting for the sawing machine to saw through the blocks.

3327. Are you in partnership with men who work underground?—No, I am not at present, but I have been so.

3328. Then how are you working now?—I am working by the day. I am a journeyman.

3329. (*Mr. Jones.*) Would you like to be separated from the men who work underground, or do you complain that they also come too early to their work?—My belief is that we all work far too many hours.

3330. What do you think would be the proper thing, how many hours a day?—Eight hours, I believe, would be quite enough for any man to be in the quarry.

3331. (*Chairman.*) Do you think that eight hours would be sufficient above-ground in the mill?—Yes, I consider it would be.

3332. Do you mean eight hours right off, or exclusive of meals?—Eight hours excluding meal time.

3333. Do you think, if you were to work more briskly than you do now, that you could do as much work in eight hours as you do at present?—The difference would be very little, I think. We feel that we work quite as much as we can, and the hours are too long as they are. After working hard all day, we get tired before the time to leave off work has arrived.

3334. (*Mr. Jones.*) As a matter of fact, have you ever taken notice of the result of your own work in the mill, whether you will be able to turn out more or less slates in the winter than in the summer, when you work long hours?—I have not taken particular notice of that, but as far as my experience goes the difference is not much when you take the hours of work into consideration.

3335. (*Mr. Evans.*) How many hours per week do you think you ought to work?—I think 48 hours a week would be enough, at any rate.

3336. To work?—Yes, I consider that ought to be the maximum.

3337. Have you ever noticed at what time of the year you can do most work?—I do not quite understand the question.

3338. Do you find that the summer weather is too hot, and that the days of winter are often too wet and cold to enable you to do as much work as you would like?—I find that in the summer we perspire very much, and strain ourselves a good deal, and in that way injure our health, but in the winter we have to work pretty hard before we get warm, and the days are also shorter.

3339. (*Mr. Jones.*) Do you think, as a matter of fact, that March is the best month in the quarries for work?—I believe, myself, that the spring is the best time of any to work in the quarries.

3340. (*Mr. Evans.*) What do you think of September and October?—I find the atmosphere heavier in those months.

3341. (*Mr. Jenkins.*) Can you work a full day of eight hours in the winter months?—No, I think not.

3342. But you are required to work a good deal more than eight hours, that is to say, you are required to be on the premises longer than that, are you not?—Yes, we have to be there from 7.30 to 4.45, when the day is shortest.

3343. Is that the case through the whole district here?—I do not know for certain that those are the hours throughout the whole of the district, but I believe there is more liberty at the other quarries, and they have not so much to complain of. That is what I have been told by other men.

3344. Were the hours extended some years ago?—If I remember rightly, that was so. I should not like to do the employers any injustice, but I think they are more particular than they used to be that we should

remain at our work until the time is up, and that we should be in our places ready to commence work at the right time in the morning.

3345. Was it not the rule in years past to follow the day?—As far as I remember that was the old plan—to follow the day as it lengthened and shortened.

3346. But at present there is a fixed time?—There is a fixed time this winter at any rate. I am not quite sure how it was last winter.

3347. How is it through all the winter months—is there a fixed time for them all?—I do not know the rule exactly. Last week we worked until 4.45, and this week we are obliged to work until 5. I do not know what the rule is exactly, but we get it from week to week or from month to month.

3348. But you are sure that the change in the rule has resulted in increased hours?—Yes, that is my opinion.

3349. (*Mr. Jones.*) Do you remember yourself coming to work at 6.30 in the morning?—I do not remember now.

3350. Do you remember yourself working until 6?—I think I remember working from 6 to 6.

3351. (*Mr. Jenkins.*) But that was a long time ago?—Yes, it must have been a long time ago. I am not quite certain of it, but I believe I have been working these hours.

3352. The quarries have been commencing work at 4 on Saturday mornings?—I have heard so.

3353. But that is ancient history?—Yes.

3354. What do you think is the object of calling the men to their work three-quarters of an hour, according to your statement, before they can commence work; is it simply to bring them there to do nothing?—No, I think not. Of course, it is impossible for me to know what my master's views on that subject are, but I do not think the object is to bring us there to do nothing. There are some of the men, possibly, who can do some work or other as soon as they reach the quarry in the morning, for instance, those who work outside can commence work earlier than the men who work under cover, and as those men can work, they call us all there at the same time, because they must have a rule which will apply to the men throughout the quarry, and not to a portion of the men only.

3355. Do you refer to labourers?—Yes, and those that work underground can of course work early in the morning as well as they can at any time during the day.

3356. But in doing that, would they not be working more hours than the men who cannot commence work until it is daylight?—Yes, they would, of necessity, and I do not consider that fair.

3357. Were the workmen consulted before the change in the hours of labour was brought about?—I am not aware that they were, but I have no knowledge at all on the matter.

3358. (*Chairman.*) Have you anything else to tell us?—There are some things in which it would be possible to have improvements effected; for instance, the machinery in the mills.

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3359. Will you tell us what they are?—One thing I should like to mention is, that the mills ought to be made suitable as regards size, and that they should also be rainproof, and otherwise suitable to work in.

3360. (*Mr. Jenkins.*) Do you know of any mills that are not so?—I do not believe that every mill is kept properly closed, in order to keep out the draught.

3361. (*Chairman.*) Have you anything else?—There is one thing that I should like to refer to again—the adjusting of the belting after it comes off the pulley. It is a dangerous thing, and has to be done often.

3362. Do you know of any accident that has happened from that cause?—Yes.

3363. And any fatal accidents?—Yes, I think so.

3364. (*Mr. Jones.*) Have you any remedy to suggest?—The circumstances are not the same in every case. When we adjust the belting on the pulleys we have only a plank about 10 inches wide to stand on, and we have nothing to take hold of except the shafting. We have to do that, and to adjust the belting when the machinery is in motion.

3365. (*Chairman.*) What fatal accidents do you recollect which have happened in that way?—I am not certain of the circumstances, but the report is, that the accident I have in my mind was caused in that way. The man's name was John Tyson Jones, and he worked at the Oakeley quarries.

3366. Was that an accident which happened in 1879?—Very likely. It was about that time, but I am not certain of the date.

3367. Was that not at the Palmerston Quarry?—Yes, what we now call the Lower Oakeley.

3368. Was he not dragged into the pulley of a slate-sawing machine?—It was the pulley of a slate-sawing machine, but it was the upper pulley—the pulley on the shafting. There is another instance of an accident which was non-fatal. It occurred in the Oakeley quarries.

3369. When was that?—I do not remember when it was exactly, but it is perhaps four or five years ago.

3370. Have you anything else to suggest?—I think there ought to be a special Act of Parliament dealing with the slate quarries of North Wales, and special inspection provided for these quarries.

3371. You mean apart from the Mines Acts?—Yes.

3372. Have you any other suggestion to make?—A suggestion has been made by some of the men, which I thoroughly agree with. Taking things as they are now, I think it is very desirable that a sub-inspector should be appointed to assist the present inspector.

3373. (*Mr. Jenkins.*) Would it suit your views if all the quarries were put under the Mines Acts?—No, it would not, because there is one part of the slate quarries under the inspection of the Inspector of Factories. If they were all included in one Act and put under one inspection, it would be an improvement—the provisions of the Mines Act and the Factories Acts incorporated in one and applied to slate quarries.

Mr. W. W. Jones examined.

Mr. W. W. Jones.

3374. (*Chairman.*) Where do you live?—At Bryn Awel.

3375. And what are you?—A slate-maker.

3376. How long have you been a slate-maker?—For 31 years.

3377. Where have you been working?—At the Lower Oakeley.

3378. You have worked there for the whole of that time?—Yes, except a few weeks.

3379. What suggestions have you to make to us?—Some of the suggestions I intended making have been made before by other witnesses.

3380. What other suggestions would you like to make beyond those already made?—What I intended referring to were the doors where the rubbish falls from the dressing machines, and also the wheels of the sawing machines, which I consider ought to be protected.

3381. What do you mean by having them protected?—To block it up.

3382. So that a man could not put his feet there?—Yes.

3383. And what else have you to suggest?—That the hours of labour should be shortened.

3384. What are your hours at the present time?—They vary at different times of the year. For the greater part of the year, that is, from about the middle of February to the end of October, the hours are from 7 to 5.30.

3385. And have you sufficient daylight during these hours?—Yes, during the summer months.

3386. Therefore you are not complaining that you are kept doing nothing at the mill, waiting for daylight?—No, there is light there then.

3387. Then in what way do you think the hours are injurious?—I believe that we are in the habit of working very hard, and as we have to work in an atmosphere in which there is a good deal of slate-dust, I consider the hours are too long.

3388. Do you think the place you have to work in is worse than a cotton factory, for instance?—I have no experience of those places, so that I cannot express an opinion.

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3389. Do you know the woollen factories here?—I have never been working anywhere but in a slate quarry.

3390. What hours would you propose?—I firmly believe that eight hours would be quite enough.

3391. Do you think you could do as much work in those eight hours as you are doing at the present time?—I do not think we could do as much work, but my opinion is that too much work is being done now.

3392. If you would do less work than you are doing now, would you be content to have less pay?—No, it is for that reason I made the remark I did. I consider we are doing too much work at the present time for the wages we receive.

3393. (*Mr. Jones.*) What do you mean by that; do you mean that you are putting too much strain on your body?—I believe that is the case, because in summer, when the weather is hot, I work in such a manner that I feel very fatigued by about half-past 4.

3394. (*Mr. Jenkins.*) When the quarrymen work very hard, do you believe that they do more work in a day—whatever its length—than they could in an eight hours' day?—No, not very much. Possibly they could do a little more, but I consider that to do more or to expect more is very unreasonable.

3395. It could be done, once in a way, under special circumstances?—Yes, quite so.

3396. But that would be putting too much strain on the body?—Yes, it would.

3397. Therefore you advocate an eight hours' day?—Yes, something like eight hours.

3398. If you recommend it for the quarryman in the sheds, is it not also desirable in the case of the underground miner?—Yes, I fully believe it is.

3399. (*Mr. Evans.*) How many hours a week do you think you ought to work?—About 48 hours.

3400. (*Mr. Jenkins.*) How many hours do the horses work in the quarries in this district?—I believe they get a good deal more rest than the men. I do not know how many hours they work.

3401. (*Chairman.*) Have you anything else to say?—I should like to say that a great many improvements have been carried out during the time I have been working in the quarry, both as regards the hours of labour and the places to work in.

3402. And I suppose you would like the improvements to continue?—Yes.

3403. (*Mr. Jenkins.*) Are things otherwise in regard to time?—There is a little change in the morning, but I do not think the change in the evening is worth mentioning.

3404. (*Mr. Jones.*) Does it follow the day, or hour?—As the last witness stated, the whistle is blown too early in the morning for us to commence work in the winter months.

3405. (*Mr. Jenkins.*) By how much?—In December, when the day is shortest, you can say that it is at least half an hour too early.

3406. Is it true that you sometimes go to the sheds when the whistle blows in the morning, and you cannot recognise your fellow-workmen except by their voices?—If we were so over-exact as to be in the mills at the time the whistle blows, and if it were a misty morning, that would probably be true.

3407. Would it get light enough in half an hour for you to work?—Possibly you might find a day in winter when it would be too dark, but generally speaking it is light enough at 8 o'clock for us to do many things that we have to do.

3408. (*Chairman.*) Have you anything else to tell us?—No, I think not.

Mr. JOHN ROBERTS examined.

Mr. J. Roberts.

3409. (*Chairman.*) Where do you live?—In Wesley Street.

3410. What are you?—I have been a rockman and a miner.

3411. How long have you been working in the quarries?—For 20 years.

3412. What quarry are you working at now?—At the Oakeley Quarry.

3413. What would you like to tell us?—I should like, first of all, to say a word about the fuse. I have never had a better test for fuse than I have had during the last four months. I never used so much of it before. We have used, I am certain, about 50 or 60 coils, and every one of them went off. I consider that if it all goes off in that way it is splendid fuse.

3414. Is it single tape fuse?—Yes, I believe it is.

3415. Then, as I understand you, you have no complaint to make as to the fuse?—No; I have never seen better fuse in my life than we have at the present time. I consider fuse to be one of the most important factors in our work. When using bad fuse I have been going myself to it when I thought it was failing. If I once doubt a fuse I am very prone to go to the hole, if it misses, before the time, but if the fuse is good a man will not go near it.

3416. What is the next point?—I have nothing to complain of in regard to the powder. I keep the rules as I keep my watch, and I find it quite as easy to do that as to do anything else. I put my lamp to the proper distance, and I have no trouble with the special rules, so far as powder is concerned.

3417. What alterations would you suggest in the special rules?—About the tamper; the only accident that has happened in my time from an explosion with tamping happened with a copper tamper, the only one I know of in 20 years. The man was working in our quarry, and he was found with the copper tamper in his hand after the explosion.

3418. Was it a proper copper tamper, or only copper-tipped?—It was a proper copper tamper. From my experience, I do not believe a copper tamper is better for safety, but even if it is it is more dangerous in another sense. It is more dangerous when you are tamping. You cannot make it so smooth and tender as the iron tamper. The copper tampers are very sharp and ragged, and if you break the fuse with the tamper, I believe it is far more dangerous than if you were to do it with the iron. I cannot believe that copper is any improvement at all.

3419. (*Mr. Jenkins.*) Is it your opinion that copper will strike fire out of the rock?—I do not believe there is any fire in the question at all. You have no fire to combat with. Where is the fire? If there is any danger it is in the tamping. I have been working in gold mines also. When I was a boy we used to tamp very hard, but now we do not tamp so hard when we use powder. I do not think we understand the special rules to the degree that we ought. It has been put in this way—that you are not to use the iron tamper, but I do not think that is the proper construction of the present rules. I do not believe that rule is properly interpreted. As far as I understand it, you are only required to cover the powder with the copper tamper, and after that you may use the iron. My tamper has been taken away from amongst my tools, and I told the sub-manager, who took it away, that I did not understand that the special rules excluded the iron tamper.

3420. (*Chairman.*) No, they do not.

(*Witness.*) That shows that we do not properly understand the special rules.

3421. (*Mr. Jones.*) Do not you find that the inspector does not understand them either?—Indeed, I cannot say. The inspector uses a lamp, but I am not allowed to do so. Is my lamp more dangerous than his?

3422. (*Chairman.*) What the special rule says is that no naked light shall be placed within 10 feet of any explosives chest, and a lamp is not a naked light?—There are a great many simple things about those special rules that are not properly understood. Your light stands sometimes at a distance of one foot from you. I think there is more danger in pillaring with a naked light than there is in going to a chest 20 times a day with a naked light.

3423. (*Mr. Evans.*) Do you suggest that the rule as to taking a candle near to a pillaring hole should be discontinued?—No, I do not, but I should say that a man ought not to be prosecuted for having it, say, within 4 feet.

3424. (*Chairman.*) You have been at the quarry for many years; did you complain at all, or did you send

any objection to the inspector when these rules were being made?—No, indeed. I must say that we are very backward in things of that kind, but of course we have never had such an opportunity as this of making things clear to you. We have never had the chance of making our views known to you before now.

3425. But do you not know my name and address?—Yes, certainly, but a man is of a very bad colour if he corresponds with the inspector. I would prefer to do it openly rather than write to you. One thing I should like very much would be for the quarrymen to imitate the colliers. I have been working there for a short time. For their own safety they act as detectives to one another. I remember once that a manager was found doing something wrong, and they brought him before the magistrates and he was fined. Although he was a manager, the men brought the matter to the notice of the employers, and he was reprimanded by them and afterwards fined by the magistrates. When we find a manager doing anything wrong we ought to be straightforward. They prosecute us, and when we see them doing anything to endanger our lives, we ought to do the same with them.

3426. (*Mr. Jenkins.*) Do you find a lack of that courage among the quarrymen?—Yes, I do, and think that is the greatest source of danger to us in some respects.

3427. (*Chairman.*) Do you think the slate quarryman in North Wales is more afraid of speaking to his master than the collier in South Wales?—No, it is not lack of courage, I think, we have not the same characteristics as the collier. They are more straightforward people than we are. They all work on the same principle, on the same contract, and under the same rules. It is not so with us, and this may be one reason for the lack of unity and straightforwardness among us.

3428. (*Mr. Jenkins.*) With regard to the fuse, when you get bad fuse and complain about it, is your complaint always attended to?—Yes, I must say it is.

3429. Invariably?—Yes. Whenever you report any danger in our quarry it is always attended to at once, so far as I can say.

3430. Have you anything else to tell us?—Some of my fellow-workmen are advocating the appointment of a sub-inspector under the Government. But myself, I cannot see that we would gain anything by that. Suppose that I was pulling something dangerous down and a sub-inspector were to come to me and tell me to pull it down and make the place safe, he ought to come to me on the following day to know that the place is made safe, and perhaps the day after that again—in fact he may have to be there day after day, and I do not know how you are to manage that. The only remedy, I think, is to have a better trained man as manager.

3431. Would you like to see it necessary for the manager of an underground slate quarry to have a certificate like the certificate of the colliery manager?—Yes, that is just what I should like to refer to. The nature of his work, and his responsibility, have been changed so in a sense that he must now be a trained man. I would make it a condition that he should have worked five years at least underground.

3432. Five years' practical experience?—Yes, five years of working underground.

3433. (*Mr. Jenkins.*) What sub-inspector do you object to?—Under the Government.

3434. Then you object to that?—Yes, in a sense, I am afraid it would slacken the management, and the management and the men themselves are the parties who are to remedy matters.

3435. Do you know, as a matter of fact, that the Government has appointed a number of sub-inspectors under the Factories and Coal Mines Acts?—Yes, and I quite agree with that, because in the collieries it is useful.

3436. Would it not be so useful in slate quarries and slate mines?—In mines it may be, but there ought to be a man who can go up the ladders to test things properly.

3437. Do you think that those who suggested a sub-inspector under the Government meant to suggest that he should examine every place in the quarry?—What is the sub-inspection? I have been trying to think it over myself.

3438. Do they not suggest another method of inspection also?—Yes, but of course I cannot say what his work will be unless he is to see to the pillars and the top.

3439. (*Mr. Evans.*) You mean that if there is to be a sub-inspector he must be always on the spot and have a very small district under his charge?—Yes, and the only remedy is to make the manager more responsible, because he must be there every day to see to things.

3440. (*Chairman.*) You want the manager to be more responsible, and to be a better engineer?—Yes.

3441. (*Mr. Jenkins.*) You referred to the managers of coal mines; do they inspect every part of the collieries every day?—Yes, certainly every day.

3442. Are there not other men under them who inspect the works?—Yes. You are not allowed to enter the underground workings without reporting yourself to the man who examined the place in the morning.

3443. Can you not have a man to correspond to that man in the slate quarries, although not confined to the same duties?—You mean corresponding to the fireman in the collieries?

3444. Yes, but I do not mean to examine every day because our circumstances are different to those of the colliers. Do not you think such a man ought to be appointed in the slate quarries?—In the special rules the manager, I think, is supposed to do that, so far as I understand the rules.

3445. But it is not required in the Coal Mines Act that the manager should visit every part of the colliery every day?—No, but an official has to do so.

3446. Would you approve of the suggestion that a Government sub-inspector, to correspond to the sub-inspector under the Coal Mines Act, should be appointed, and another inspection made corresponding to the one that is made by the fireman in the collieries—would you approve of something in that direction?—I would, in a way, approve of it, if you would include mines as well.

3447. Of course it does include mines?—We want him to be a practical man, but where can we have a practical man, who is also able to test gases and so on. Say if I worked in a place where the air is bad, where can you get a practical man to test that air. That is the difficulty, to my mind, and the present inspector does that.

3448. Do you know that the standard of examination for these sub-inspectors is not very high?—I cannot say. Some of my fellow-workmen advocated the building of walls across disused levels. Now, I should say unless these walls would be very wide, it would increase instead of decrease the danger. I would prefer to see one lump of rock come rather than several. Supposing a lump comes from the blast, it would knock the wall down and bring other lumps with it, but if the wall were not there the lump from the blast would come alone.

3449. Do you think that a lump would come from a level with sufficient force to knock down a wall?—Certainly, unless the wall is made a yard wide at least.

3450. What is the distance that it would travel?—I cannot say. I have not tried the velocity; but you will have to build a very strong wall, I am certain of that. In reference to the question of the eight hours' day, it is the general cry these days, and I quite believe in it, but I would not like to work long on Saturdays. I believe we can do exactly the same work in eight hours as we do now, but I would not like the law to step in and say how many hours I am to work. I should like to come to an understanding about it with my masters, but not to be compelled by law to do it.

3451. (*Chairman.*) You think that improvements have been going on for a large number of years?—Yes.

3452. And you believe the improvements will not stop?—No, they will go on, I believe. We want to be improved as a class, and the time will come that we shall get what we want. A slow progress of that kind is bound to go on. Years ago the quarrymen commenced to work at 4 o'clock in the morning on a Saturday; but that system is now buried, and rests in peace.

3453. (*Mr Jenkins.*) But you would rather go forward than backwards, by means of the law?—Yes, certainly. One thing has struck me very much as showing that we are improving. I do not think you can find 4,000 people anywhere throughout England where there is so

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little crime as there is amongst the Festiniog quarrymen. That is a proof, to my mind, that there is not so much poverty among us. Where I find crime, I can always find poverty at its root. Poverty, I believe, is the great cause of crime. I believe also that we have the best machinery in the way of elementary education throughout the kingdom. We pay the highest salary, and we have the highest grants from the Government. One medical gentleman has complained that we are drinking the filthy water which is running in our dark holes, but I want you, gentlemen, to have a higher view of us than that, and to this charge I should like to give my strongest denial.

3454. (*Chairman.*) What have you to say about the want of privy accommodation?—We have to go outside now. That is the rule with us at present. If any of us were found not going outside, we would be reprimanded.

3455. Do you think there ought to be privies provided?—Yes, I think so.

3456. Are the privies that you have above-ground sufficient?—Indeed I cannot say.

3457. (*Mr. Jenkins.*) Do the men sometimes, and under some circumstances, get very thirsty underground?—Yes, men that are not used to work much under-ground.

3458. When they get very thirsty, can they resist the temptation to drink any sort of water they can get hold of?—I have never seen a man in my life drink water inside, and I have been trying to remember whether I have ever seen anything of the kind. I very often drink the water which is outside.

3459. Would you be surprised to hear that I have been drinking it when I was very thirsty, although I knew it might be bad water?—Some men are very thirsty, but it is not the general practice to do so.

3460. (*Chairman.*) The question I now put to you is not my question, but it is one I have been asked to put. If it is necessary for the manager of a quarry to have practical experience in a mine, is it not necessary for the Government inspector also? The question reads thus:—"Should it not be so necessary for the Govern-"ment inspector to be so equipped in practical know-"ledge as the quarry manager in the slate quarries?"—There is a great difference in their work. The Government inspector has to do with the powder, and to inquire into accidents when they happen, but he is not required to run up ladders and to test the top, so far as I understand matters. The manager, on the other hand, is a man who ought to see to everything. He ought to see to the working of the vein all through. He should be able to go to the top of a ladder to test the rock and so on, but you cannot expect a Government inspector to do that, and I do not think that the special rules or anything else require him to do it.

Mr. G. Davies.

Mr. GRIFFITH DAVIES examined.

3461. (*Chairman.*) Where do you live?—At Ivy House.

3462. And what are you?—A rockman.

3463. Where do you work?—At the Upper Oakeley Quarry.

3464. What do you want to bring before the Committee?—The principal thing I should like to refer to is No. 61 of the special rules.

3465. What is that special rule?—It is the rule as to explosives, and we, as workmen, consider that rule too oppressive.

3466. That rule reads thus:—"Every workman or "party of workmen possessing explosives shall keep "them in a secure chest. The chest and its fittings "shall be so constructed, or so lined or covered, as to "prevent the leakage of any explosive and the exposure "of any grit, iron or steel, or similar substance, in "such a manner as to come in contact with the explo-"sives. The chest, when containing explosives, shall "be kept locked, except during the operations of "putting in, taking out, or sub-dividing explosives. "All metal work in the locks, bolts, hinges, &c. shall "be of brass, copper, or similar material. On the "outside of the chest there shall be affixed the word "'Explosives' in conspicuous characters by means of "a securely attached label or other mark." Is that the rule of which you complain?—Yes.

3467. What is there in it that is objectionable?—I have nothing against the chest as a chest, or as a proper place to keep powder.

3468. Then what is your complaint?—That we have to keep our bugles and horns. Wherever we have been using them we must take them back to keep them in this chest, and we consider that not only impracticable but bordering on being dangerous.

3469. Who compels you to do that?—The manager of the quarry, or the officials.

3470. Did I ever compel you to do that?—I should like to have some light thrown upon that rule.

3471. Did you not hear Mr. Robert Roberts, the manager of the Oakeley quarries, say that he read this rule with the proviso "so far as is reasonably practicable"?—I was told that he said that, but I did not hear him say so myself.

3472. Is there any other point about that rule that you object to?—I have nothing against the rules, but that is the most unreasonable and impracticable rule, in my opinion.

3473. What is the next point you have to put before us?—I believe that the Government inspector ought to have an assistant, and that the assistant ought to be a man who has worked in the underground quarries for 10 or 15 years. My reason for saying that he should have worked in these underground quarries is that there is so much difference between the joints in the open quarries and the underground quarries. I suggest a practical quarryman as the sub-inspector for the reason that, when an accident happened, he would be able to form an opinion of his own as to the cause of the accident, without asking anyone else. Now that the working of the quarries has been made the subject of a Government inquiry, I would like to suggest another question which the Government ought to take up, and that is that the expense of making these places safe should be paid out of the royalty.

3474. How would that answer if the property is freehold?—I consider when I buy a property that I am to benefit by it.

3475. But if no royalty is being paid, say at Cwmorthin, who is to pay in that case?—The company themselves should pay, if they own the quarry, but where there is a heavy royalty, as is the case in most of these quarries, the danger is that the company may lose money if they have to do that work at their own expense.

3476. But if the company said to the lessor, "You "have got to do this work," would not the lessor ask for a higher royalty at once to meet that?—I am speaking now of circumstances in consequence of which this country is in danger.

3477. What are those dangers?—Many of the chambers may possibly get dangerous, and it may be too expensive a matter for the company to put them right, and they may be poor places. Inasmuch as the landlord has benefited from those places, I believe part of that money ought to go to make the place secure.

3478. What is the next thing you have to tell us?—I believe you have something to say about the eight hours' question?—I have been speaking to my fellow workmen whom I represent upon the subject, and I find that we are very much divided on the question.

3479. And if you are divided on the question it is impossible for you to tell us anything definitely on the subject?—Yes, it is. I must tell you the truth, and I find we are very much divided.

3480. (*Mr. Jenkins.*) Do you know that at a general meeting of the men employed at these quarries, which was very well attended, a strong resolution was adopted on this eight hours' question?—Yes, more than once.

3481. Was any special objection raised to it at that time?—If I remember rightly a resolution was passed at one time at Carnarvon on the subject, but the question seems to have fallen back since then, at any rate among many of the men, and what they are now pressing for is a board of arbitration.

3482. Do you know that the question of the board of arbitration was contained in the first part of the resolution, which was passed at the meeting here?—Yes, if I remember rightly it was so.

3483. As to the sub-inspector, do you mean that one should be appointed to assist Dr. Foster?—Yes, that is

what I intend, but I would prefer to see things remain as they are, unless we can get a man who understands his work thoroughly.

3484. Do you think that would meet the views of the workmen here?—Yes, I believe it would, and much more so than an eight hours' day.

3485. Have you any special objection to eight hours yourself?—I am not a very strong advocate of an eight hours' day, but I believe that no man should work in a damp or smoky place for more than eight hours.

3486. It is always smoky underground in these quarries, for the greater part of the day?—It is so in the summer, as a rule.

3487. And you consider eight hours a day quite sufficient for a man to work in that atmosphere?—Yes, especially in this weather, when a man gets wet.

3488. In what way do the men get wet, so far as your experience goes?—By droppings from the top, and sometimes the water trickles over the face of the rock.

3489. Have they to put a rope round their thighs to work?—Yes, but if I worked in a wet place I would take a chain instead of a rope.

3490. Are there many places where the men do not use chains, but always ropes?—We use ropes even if we have a chain.

3491. When a man is working in a wet place of that kind with a rope around him, what is the effect?—A rope will carry more water to the body than a chain will.

3492. A rope will carry a stream of water from the upper parts of the rock to a man's thighs?—Yes, it will, and that must be very injurious.

3493. Have you seen many men wet to the skin in that way?—Yes, I have, and I have been so myself.

3494. (*Chairman.*) Would you like to have a place at the quarry where you could change your wet clothes and have them dried?—We are fairly situated in that respect.

3495. Have you a place where you can change your clothes and dry them?—It is very few of us that do get wet, and those who do get wet can get their clothes dried.

3496. (*Mr. Jenkins.*) Can you tell us how to stop the water from running over the rocks in that way?—Yes, a dam could be made, and care should be taken to clear the rubbish from the top of the rock.

3497. That would prevent it from going down?—Yes, it would.

3498. Would that pay for the expense and labour expended on it, do you think, in the way of producing more work for the wages paid?—If it is possible to do it, it would pay the man himself to do it, even if he and his partners were at it for a whole week. *Mr. G. Davies.* 16 Jan. 1894.

3499. And if it would pay the man, would it not pay the master also?—Yes, certainly.

3500. (*Chairman.*) If it would pay the men, why do they not do it now?—Possibly it may take more than a week, but if by that means they could get rid of the water for two months it would pay.

3501. (*Mr. Jenkins.*) It would also pay in the sense of giving the men better health?—Yes, it would.

3502. Do you know of any men who have suffered in their health owing to that kind of thing?—I do know of men, but I am not going to mention any names.

3503. Where the company that works the quarry also owns it, would that be an inducement to cut the pillars?—I have not noticed that anything of that kind takes place.

3504. Do you know of anything that would prevent them doing it? Would it not be an inducement?—Of course the company could make more money.

3505. And if the company did so, would that endanger the lives of the workmen?—Yes, my plan of cutting the pillars would differ from theirs; I would have openings made to the top in the pillars along the line of strike, which I think would be a source of strength to the pillars and roof.

3506. Do you know that lessors often have a provision in their leases that the pillars and chambers are to be left of a certain size?—Yes.

3507. And is that done in order to protect the property?—Yes, it is.

3508. If that is done in order to protect the property, should it also not be done to protect the lives of the workmen?—That is what I was referring to.

3509. Have you anything else to say about that?—No, I have nothing else on that point.

3510. Is there anything in the law to prevent the owner of a quarry who works it himself to cut the pillars altogether, if he wishes to do so?—No, nothing at all.

3511. Should there be, in your opinion?—Yes, of course, to protect the lives of the men.

3512. (*Chairman.*) Have you anything else to tell us?—No, nothing at all.

SIXTH DAY.

At the Cocoa Rooms, Blaenau Festiniog, 17th January 1894.

PRESENT:

DR. C. LE NEVE FOSTER IN THE CHAIR.

MR. J. E. GREAVES, J.P.
MR. E. P. JONES, J.P.
MR. J. J. EVANS, F.G.S.
MR. JOHN JENKINS.

MR. ROBERT ROBERTS, Manager of the Oakeley Slate Quarries, was recalled, and examined by the Chairman. *Mr. R. Roberts.* 17 Jan. 1894.

3513. I believe you have something further to say to us?—Yes, I should like to refer to the water question, and to reply to what Dr. Evans said in his evidence about the drinking water at the Oakeley quarries. Dr. Evans, in his evidence, alleged two things with regard to the drinking water, both charges, no doubt, being founded on gossip. He told the Committee that the officials did not drink of the same water as the workmen drank from. He told you, too, that the water was bad.

At the Oakeley Upper Quarry the two assistant managers and the two slate inspectors do drink of the same water as the workmen.

At the Oakeley Middle Quarry the two assistant managers, and the two slate inspectors drink of the same water as the workmen drink from; and at the Oakeley Lower Quarry the three assistant managers and the four slate inspectors drink of the same water as the workmen drink from; but the clerks at the office and myself drink from another source, although personally, and putting together the time spent by me at the Middle and Upper Quarries, I have drunk of the same water as the workmen of the above-mentioned two quarries for about thirty years.

The second charge, no doubt founded on gossip, was a most undignified and a most unprofessional charge for a medical man to make, unless, of course, the charge

Mr. R. Roberts.

17 Jan. 1894.

was well founded. However, inasmuch as the charge had been made, I felt compelled to have the water analysed, and therefore sent three samples of it up to London with a note, a copy of which I will read and put in:—

(Copy).

The Oakeley Slate Quarries Company, Limited,
Blaenau Festiniog, North Wales.

DEAR SIR, 27th December 1893.

I TRUST the water will have arrived all right. No. 1 sample has been obtained at the Oakeley Middle Quarry, having been piped in iron pipes most of the way, thence an open brook to the reservoir, at an altitude of from 1,400 to 1,500 feet. Geological formation of catchment mostly slate, outcrop in places mostly covered with peat, and some clay, formed, I suppose, of decomposed slate.

No. 2 sample has been obtained at the Lower Quarry, having been piped about half the way; thence an open brook to the reservoir, whose altitude is about 1,050 feet. Catchment of No. 2 reservoir is very similar to catchment of No. 1 reservoir.

No. 3 sample trickles down the forebreasts of some igneous rock (agglomerate), and over some slate rock; but whether from a spring as its source I cannot say, because the place is covered with slate débris.

Now, the question is, are samples No. 1, No. 2, and No. 3 good drinking water. An answer will oblige,

Yours etc.,
(Signed) RT. ROBERTS.

Professor Thomas Stevenson,
Guy's Hospital, London.

Previous to the 27th December there had been a very heavy rainfall (*vide* Register for December 1893) and any impurities, had there been any, would have been washed and carried into the reservoirs, and there held in suspension or in solution, or both, and as a matter of course would have found their way into the pipes in drawing the water from the reservoirs for the use of the quarries.

I will now proceed to read the report and the analysis of Professor Stevenson on the three samples of water. I should here add that No. 3 is the water referred to in Mr. William Morris's evidence.

Report of Thomas Stevenson, M.D. London, F.R.C.P., Lecturer on Chemistry at Guy's Hospital, F.I.C., on analysis of three samples of water received 28th December 1893, from the Oakeley Slate Quarries Company Limited, Blaenau Festiniog, North Wales.

The samples were delivered under seal "O.M.Q.," were enclosed in glass-stoppered bottles, measured each half a gallon, and were labelled respectively:—

"Sample No. 1 of water. Bottled on the 27th December 1893, at the hour of 2.30 p.m. by Robert Roberts.

"Sample No. 2 of water. Bottled on the 27th December 1893, at the hour of 3 p.m., by Robert Roberts.

"Sample No. 3 of water. Bottled on the 27th December 1893, at the hour of 2.40 p.m., by Robert Roberts."

The results of the analysis, as stated below, are expressed in grains per gallon, and hardness on Clark's scale.

All the samples were of excellent and unexceptional physical character, being free from turbidity, deposit, odour, and colour when viewed in a stratum two feet deep.

Nos. 1 and 2 had a very pale green colour.

No. 3 was as colourless as quite pure water.

These waters are all of excellent character, soft, palatable, and containing very little saline matter. They have the highest degree of organic purity, and are equal to the best upland waters. They are well fitted for domestic supply, and for manufacturing purposes. They would form an admirable town supply.

I find that these waters have very little action on lead. When allowed to rest in clean leaden pipes for 24 hours, No. 1 took up no lead into solution, Nos. 2 and 3 took up traces of lead only. The fitness of drinking supply of these waters is thus further established.

Nos. 1 and 2 are practically identical in character, and equally well fitted for domestic use and manufacturing purposes.

No. 3 differs from Nos. 1 and 2 only in this, that it contains between 2 and 3 grains per gallon more of fixed lime salts (gypsum); and hence it is the hardest of the waters. This will render it rather less acceptable for steam-boiler purposes than Nos. 1 and 2; but for domestic use the difference will be found to be insignificant.

(Signed) THOMAS STEVENSON.

Guy's Hospital,
January 3, 1894.

To Robert Roberts, Esq.,
The Oakeley Slate Quarries Company, Limited,
Blaenau, Festiniog.

ANALYSIS.

—	No. 1.	No. 2.	No. 3.
	Grains.	Grains.	Grains.
Total solid matter	1·96	2·17	4·76
Losing on ignition	0·56	0·84	0·84
Combined chlorine	0·63	0·63	0·63
(Equal to common salt)	1·04	1·04	1·04
Nitrogen as nitrates	Traces.	Traces.	Traces.
Nitrates	None.	None.	None.
Lead, copper, and injurious metals	None.	None.	None.
Ammonia	0·0005	None.	None.
Albuminoid or organic ammonia	0·0025	0·0020	0·0010
Oxygen required to oxidise organic matters	0·041	0·032	0·012
Hardness:—			
Temporary	None.	None.	None.
Permanent	0·9	0·9	2·1
Total	0·9	0·9	2·1
Acidity or alkalinity	None.	None.	None.

(Signed) THOS. STEVENSON.

January 3, 1894.

It should be observed that any quantity of the water in question is to be found within three minutes' walk to each dining-room or eating place of the workmen.

Mr. Owen Rowland Jones, in reply to question 1339, *re* water, said: "I should like to add that the drinking "water ought also be seen to. It is very essential we "should have a proper supply. The water we have at "our quarry is such that the manager has warned us "not to drink it without boiling it." Mr. Owen Rowland Jones, in his answer, kept back a part of the truth, otherwise I should not have taken up the time of the Committee to explain fully the circumstances under which I advised the workmen to boil the water before it was drank. The drought of last year extended from the 8th of March to the 22nd of June (*vide* rainfall register), the rainfall in the meantime being only about 7·79 inches, so that we were bordering on a water famine, and the reservoirs had run low. It was under these circumstances that I advised the workmen to boil the water before it was drank, and it is the only time on record I deemed it my duty to do so.

With regard to privies, Dr. Evans told you in his evidence that his visits to the quarries were like an angel's (a fallen angel, I presume) visits—few and far between, and yet he undertook to tell you that the few privies at the Oakeley Quarries were filthy. Within the last few years I have built three privies, one at the Lower Quarry in the pit, to seat four, which is flushed every evening; another has been built to seat two, in the pit, at the Middle Quarry, and a stream of water passes underneath it; and another has been built in the pit of the Upper Quarry, with a stream of water passing underneath it. These privies are all clean, and free from any offensive smell.

RAINFALL at OAKELEY QUARRIES, RHIWBRYFDIR, in the Month of December 1893.

Date.	Inches.	Date.	Inches.	Date.	Inches.
1	—	12	·82	23	
2	·57	13	·30	24	1·18
3		14	1·28	25	
4	·10	15	·21	26	·7
5	·14	16	·70	27	·11
6	·90	17		28	·3
7	·20	18	·86	29	—
8	·50	19	·79	30	·5
9	·65	20	·21	31	
10		21	·54		
11	·23	22	·89	Total,	10·83

(Signed) ROBERT ROBERTS.

RAINFALL at OAKELEY QUARRIES, RHIWBRYFDIR, in the Month of March 1893.

Date.	Inches.	Date.	Inches.	Date.	Inches.
1	·26	12	—	23	—
2	·07	13	—	24	—
3	1·70	14	—	25	—
4	—	15	·30	26	—
5	·37	16	—	27	—
6	·12	17	—	28	—
7	·04	18	—	29	—
8	—	19	—	30	—
9	—	20	—	31	·30
10	—	21	—		
11	—	22	—	Total,	3·16

(Signed) ROBERT ROBERTS.

RAINFALL at OAKELEY QUARRIES, RHIWBRYFDIR, in the Month of April 1893.

Date.	Inches.	Date.	Inches.	Date.	Inches.
					—
1		12	—	23	·30
2	·11	13	—	24	—
3		14	—	25	—
4	—	15	·37	26	—
5	—	16		27	—
6	—	17	·14	28	—
7	—	18	—	29	—
8	—	19	—	30	—
9	—	20	—		
10	—	21	—	Total -	·92
11	—	22	—		

(Signed) ROBERT ROBERTS.

RAINFALL at OAKELEY QUARRIES, RHIWBRYFDIR, in the Month of May 1893.

Date.	Inches.	Date.	Inches.	Date.	Inches.
1	1·67	12	—	23	·5
2	·50	13	·11	24	—
3	—	14		25	—
4	—	15	·15	26	—
5	—	16	·15	27	—
6	—	17	·38	28	—
7	—	18	·23	29	—
8	—	19	·71	30	—
9	—	20	1·80	31	—
10	—	21			
11	—	22		Total -	5·75

RAINFALL at OAKELEY QUARRIES, RHIWBRYFDIR, in the Month of June 1893.

Date.	Inches.	Date.	Inches.	Date.	Inches.
1	—	9	—	17	—
2	—	10	·31	18	—
3	·33	11		19	—
4		12	—	20	—
5	·5	13	—	21	—
6	—	14	—	22	·82
7	—	15	·13	Drought at an end.	
8	—	16	—		

Rainfall to June 22nd	- - -	·82 inches.
,, in May	- - -	5·75 ,,
,, ,, April	- - -	·92 ,,
,, ,, March	- - -	3·16 ,,
Total	- -	10·65 inches.

(Signed) ROBERT ROBERTS.

3514. What about privies underground?—We have none underground.

3515. Have you noticed offensive smells in the workings or in the disused chambers?—I have, to some extent, but far enough from the working places of the men.

3516. But have you noticed in the working places of the men any offensive smell?—No, none whatever.

3517. Do you think that the men can be affected in any way by excreta deposited in those disused chambers?—I do not think so.

3518. (*Mr. Greaves.*) Have you had any difficulty in preventing the men committing a nuisance in the workings?—Yes, I have.

3519. (*Mr. Jones.*) My impression of Dr. Evans' evidence is that he said here, with regard to the water, that you were drinking one water and the men were drinking another. That is my impression as to what he said with regard to the office water. (*Witness.*) I beg your pardon. He said distinctly, "the officials "drink water from another source."

3520. That is my impression, received from his evidence. I am not going to take my impressions from anyone else. (*Witness.*) It is not a question of impressions, but of fact.

3521. Well, we will get the facts later on. (*Witness.*) I considered it a reflection upon me, and I made a note of it. He said distinctly that the officials drink different water to the workmen. I should like to explain to the Committee why it is that we drink water from another source.

3522. As far as I remember Dr. Evans' evidence, he only referred to water coming from a lake to the Upper or Middle Quarry, and he made the remark that he heard from somebody, exactly as you have stated to-day, that the water ran down very low, and that it was not fit for drinking purposes. With regard to the other waters that trickle down, I think we were all unanimous about it?—I should like to explain the matter to the Committee now, so as to make it quite clear. Soon after the amalgamation we were knocked about a good bit from one office to another. We shifted from the Upper Quarry office to the office of the late Welsh Slate Company. Mr. Robert Owen is present, and he will bear me out in this. We occupied the same office as they did, and it appears that the office-man employed by the late Welsh Slate Company went for drinking water for the officials to Talywaenydd, and he continued to do the same after we took possession of the office. Previous to that I drank of either the water of the Middle or of Upper Oakeley.

3523. I suppose you would be quite content to drink it now?—Certainly.

3524. (*Mr. Greaves.*) You drank the Talywaenydd water, simply because it was the most convenient water?—Yes, certainly.

3525. (*Mr. Jenkins.*) Is it now the most convenient water?—No, it is not.

3526. Where does the water in the Middle Quarry come from?—I explained that very fully in the statement I have just made. No. 3 sample trickles down the forebreasts of some igneous rock (agglomerate), and over some slate rock after it has issued out of the pipe, and where the men get the very water that they use at their meals, and so on.

3527. Is there any danger of contamination there?—No, none whatever.

3528. As to the other water from the lake, which the shedmen drink,—where does that come from?—Do you refer to No. 1 sample?

3529. I believe it is called No. 1?—No. 1 sample has been obtained at the Oakeley Middle Quarry, having been piped in iron pipes most of the way, and afterwards running as an open brook to the reservoir at the top of Craig Nythygigfran.

3530. It is not within the precincts of the quarry there?—I have described the catchment as fully as I can.

3531. It is practically on the mountain?—Yes.

3532. (*Chairman.*) Wherever it comes from, it seems to be very good water?—Yes, certainly.

3533. (*Mr. Evans.*) If you have taken the water from the sources from which the men drink, I think it is very satisfactory?—(*Witness.*) Yes, I have taken it from the identical places.

3534, (*Mr. Jenkins.*) You have no filters of any sort?—Personally, I have one for my own use at the office, but we have none for the workmen.

3535. (*Chairman.*) Do you think the men ever drink the water that trickles down the face of a chamber

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inside the quarry?—That I do not know. I have never seen it done, and I certainly would object to it most strongly if I saw it done.

3536. (*Mr. Evans.*) Is there any water in the quarry that they can get besides that if they want any drink?—Yes, in some places.

3537. (*Chairman.*) With regard to dialling,—can any of your men or under-agents do surveying and dialling?—Yes.

3538. Many of them?—Yes, several of them.

3539. Do you think, with regard to the managers in the district generally, that they are competent surveyors or not?—I cannot say.

3540. You are not aware that they are?—No, I am not aware that they are.

3541. (*Mr. Jones.*) You said, I think in your evidence the other day, that you fine the men in the quarry for breaking the special rules?—Yes, I did.

3542. Do you think you have power to do that?—Yes, I think I have. If I had known that you would have asked the question I would have brought a record of a case in point which would have borne me out. I think I drew the attention of the chairman to this very case some years ago.

3543. (*Chairman.*) Yes you did. It was a judicial decision. (*Witness.*) Yes.

3544. (*Mr. Jenkins.*) I believe it was said in evidence here that other quarry owners subscribe towards the maintenance of the Oakeley Quarries hospital—is that the fact?—I understood that it was said it was done *pro rata* some years ago, but that is not the case at the present time.

3545. What is the rule now?—Practically it is confined to our quarries, but in a case where an application is made on behalf of an injured man, and a guarantee is given for the payment of his expenses, he is admitted. I have seen cases from the Cwmorthin Quarry, for instance, being admitted. I believe Mr. Robarts paid the expenses of those men. He will correct me if I am wrong.

3546. And that is an arrangement open to everyone?—Admissions have been made in pursuance of applications in cases of that kind, and where the payment has been guaranteed.

3547. (*Mr. Evans.*) The question of the hours of working was referred to pretty fully by several of the men yesterday. Have you any objection to give us your opinion as to what is a reasonable time for a quarryman to work per day?—I should think that the time we work at present is about reasonable, when you take all the deductions into consideration before and after meal-time, &c., Of course, we ring or whistle in the morning at 7.30 at present, and we go on until it is more or less dusk.

3548. And what time do you call that?—It is 5.0 o'clock this week, and last week it was 4.45, but the men are not in their working places by a long way when the bell or whistle goes.

3549. Are they on the premises?—Yes, they are on the quarry premises, which are of course very extensive. It is the rule (and we say nothing to them), for the men to take sometimes 15 minutes to get to the various dining rooms, and they cannot do it in less time and to walk the distance most of the underground men have to do from their working places.

3550. That is, from the bottom?—Yes, and they do not leave the dining rooms again until the whistle goes, and it takes them about the same time to return to their various working places.

3551. What time do you usually allow for dinner?—Half-an-hour, at the request of the men.

3552. And do you consider that sufficient?—I have endeavoured to show you now that it is not half-an-hour that they take.

3553. But do you consider half-an-hour sufficient?—For them to eat only, do you mean?

3554. No, the whole time?—No, they cannot do it, and they do not do it.

3555. So that the half hour is only a nominal allowance?—Yes, that is it.

3556. In reality they get more than that?—Yes, about an hour, as regards the pitmen, but as regards the shedmen they work close to the dining-rooms, and it is only a matter of a few minutes for them to get to them.

3557. You consider that half-an-hour is sufficient for the men in the sheds?—Yes, and they think so themselves, for they made the application to reduce the hour allowed for dinner to half-an-hour.

3558. But you may be of a different opinion to the men?—I should rather see them take more than half-an-hour for dinner during the summer months.

3559. (*Mr. Jenkins.*) The half hour is simply for eating?—Yes, that is how I take it and look at the question.

3560. And time is allowed for the men to go to and from their respective working places?—We say nothing as to that, unless we find the privilege abused.

3561. (*Mr. Jones.*) You referred just now to an application having been made by the men,—what application was that?—We used to allow an hour at mid-day for dinner, and the men themselves made an application of their own accord to reduce it to half-an-hour, and that was granted to them.

3562. (*Mr. Evans.*) Is it half-an-hour all the year round, or only part of the year?—Yes, all the year round.

3563. (*Mr. Greaves.*) Can you give the Committee any idea as to the average working hours, taking the year all through?—I went into the question some time ago, but not recently, and I cannot give you an answer just now, because I do not remember my figures.

3564. (*Mr. Jenkins.*) You cannot give us the dates when the time changes?—No, I cannot.

3565. (*Chairman.*) What are the longest hours?—From 7.0 to 5.30.

3566. That is in the middle of summer?—Yes.

3567. (*Mr. Jenkins.*) And what are the shortest hours?—We ring at 7.30, and leave off about 4.45.

3568. That is the shortest day?—Yes.

3569. (*Chairman.*) Some of the men said yesterday that they had to arrive at the mills half-an-hour or three quarters of an hour before they can commence work?—They can surely put the tables in motion to saw the blocks.

3570. It would not take that time to put the table in motion?—No, but a circular saw will take about 20 minutes to saw a table-load of blocks or slabs.

3571. (*Mr. Evans.*) Can you put blocks on the table during that time?—Not very well. The quarriers are very much in the minority. For instance last pay, if my memory serves me aright, they numbered 476 as against 1,176 who use artificial light. To my mind the majority is a very big one—1,176 as against 476—and surely they ought to rule and govern in a matter of this sort, I should say.

3572. (*Mr. Jenkins.*) The above-ground men are in a large minority?—The shed men or quarriers are 476, as against 1,176, and the two together mean the total number of men employed at the Oakeley quarries.

3573. (*Mr. Jones.*) You mean to say exactly what we heard here yesterday, that the rockmen and labourers, and men working out can start at 7.30?—Yes.

3574. (*Chairman.*) All can start then with the exception of 476?—Yes.

3575. (*Mr. Jones.*) Is it the practice for the men to put their slabs on the table the night before?—Yes, it is.

3576. And then start the tables in the morning?—Yes.

3577. (*Mr. Greaves.*) You do not want much daylight for that?—No.

3578. And it is only for a short time, I presume, that that state of things exists?—For about two months.

3579. And there are 13 months in the quarry year?—Yes.

3580. (*Mr. Evans.*) I suppose it will commence at the end of November, and finish in January?—I do not remember the dates and months at this moment.

3581. (*Mr. Jenkins.*) They cannot do anything else except wait for the sawing machine to start?—They can carry the blocks to the heap (*tocyn*, W.) ready for splitting.

3582. (*Mr. Jones.*) They can make their *tocyn*?—Yes.

3583. (*Mr. Evans.*) Have they anything to do with the waste?—They have to carry the waste within reach of the clearers.

3584. Do the quarriers do that?—Yes; the quarriers carry the waste within reach of the cleaners.

Mr. CHARLES WARREN ROBERTS, examined by the Chairman.

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3585. You are the resident manager of the Llechwedd Quarry?—Yes, I am.

3586. Were you brought up as an engineer?—Yes, as a civil engineer.

3587. And have you had a great deal of experience in this country and abroad in civil engineering works?—I have had 22 years,

3588. In this country and abroad?—Yes; 7½ years abroad, and the rest in this country.

3589. I believe you can make some suggestions for improving the safety of the quarries?—I distinguish between accidents caused by falls of rock from the roofs and pillar-sides, and those caused from falls of rock from the working face of the bargain, for the reason that the conditions are so dissimilar. With regard to the latter, I consider that the bargain-taker should exercise every care and precaution himself, and that the lessening of accidents from this cause can best be arrived at by a careful observance of the special rules, and careful working on the part of the bargain-taker.

The prevention of accidents from falls of rock from the roof and pillar-sides is of a very different nature, requiring at times special arrangements and facilities (not at the command of the bargain-taker), before the examination and safety of the spot can be arrived at.

The Committee having invited suggestions with a view of ascertaining a more convenient method of testing and working upon unsafe places, I will, with their consent, endeavour to explain one or two methods that may be found more advantageous than those at present in use.

It has, I think, been admitted by everyone that the two requirements for efficiently testing the soundness, or otherwise, of a roof are by ocular and oral demonstration and of course this is very simple where the roof is within easy reach of the working face of the bargain, and my suggestions do not refer to this, but to cases where there are no means of reaching the roof without making special arrangements.

The difficulty of throwing a light upon the spot it is desired to examine has never yet been efficiently solved, as the Wells light, although in itself a good, powerful light, cannot be placed near enough to the object, and the view of the observer is rendered imperfect by the strong glare close to him. The testing of a spot 50 to 80 feet above the platform of a bargain can at present only be done with any certainty by erecting a ladder long enough to enable a man when on the top to examine the spot with a light, or sound it with a hammer. An apparatus that would do this, and be under the entire control of the operator standing on the floor or platform of the bargain would, if efficient in its action, greatly facilitate this work.

With this in view, I tried a contrivance a few years ago, but it was practically a failure. It, however, assisted me in knowing what not to do, and from the experience then gained an apparatus has since been devised and will shortly be tried.

I now pass on to the consideration of a method for facilitating the removal of any rock that may be found unsafe. The plan in vogue at present is to erect a long ladder, in order to reach the desired spot, and this often takes several days to accomplish, and when it is done it is only from the top of a very unstable structure that any work can be carried on. I should like, therefore, to suggest to the Committee a method which, if found practicable, will have many advantages over the present one.

Instead of a ladder, I suggest using a light steel telescopic mast, made in convenient lengths, with a taper of, say, one inch in every 10 feet. Thus, supposing at the top it had a diameter of 8 inches, a mast of 25 yards long would have a diameter of 15½ inches at the bottom. This mast would be up-ended vertically, and then telescoped out to the required height by special mechanical arrangements. The top length of the mast would be fitted with an appliance for securing the guy ropes to, and would also carry a pulley through which a rope would be passed before the mast was erected. Having erected the mast and secured the guy ropes, you have a vertical column of steel reaching from the floor of the bargain to the roof. Round the base of the column I propose to attach a light staging or cage of steel or other suitable material, constructed in two pieces, and fitted with a hand-rail. This cage being secured to the above-mentioned rope, can be hauled up to the top by means of a light winch, with the workman and his tools inside. Provision can easily be made to keep the cage from swinging as it passes up the constantly reducing diameter of the mast. By some such method as this, a steady level platform will be obtained, and more and better work done than is possible at present.

Accidents from cranes are, I regret to say, too frequent, many of them no doubt occurring through carelessness on the part of the men. From a careful study of this matter, I find the chief want is something that will sustain the load at any moment when the pressure is removed from the handles. This may occur from the men not being able to raise a heavy block without resting, when possibly one man may, by taking the weight off his handle, cause a sudden strain on the other one, wrenching it out of his partner's hand, or a handle may slip off the spindle in the act of winding, throwing all the strain on the other handle. It is true that a ratchet and pawl would overcome this, but it would be very inconvenient when it is desired to lower the block on to the trolly, and it would necessitate the man removing the pawl and throwing another one into gear for the descent of the block, and this many men would not trouble to do. For securing the suspension of the load, I consider the chain now used between the spur-wheel and pinion to be more efficient than a ratchet and pawl. With a view of carrying out these considerations, I had a crane specially made to work with a worm wheel, and although it was safe enough, the men did not like it, because it was so heavy to work and so slow, and I had to abandon it. Since then, however, an arrangement has been designed, and is now being constructed, and I have every reason to think it will answer the purpose required. It can easily be adapted to existing cranes.

With reference to the inspection of cranes, I consider the best inspectors are the men who are daily and hourly using the same, and who can report anything they consider out of order to the management.

Care is taken to provide the best material for the work, and all crane and rock chains are supplied free of charge to the men, and submitted to the Admiralty test, and each lot is accompanied by a certificate.

The simplest and best method of avoiding accidents from explosions is a hearty co-operation between the men and the management in the carrying out of the special rules, which I felt ought to be adopted by every quarry in the district. It is most important that men moving from one quarry to another, when seeking work, should know exactly what is expected of them in this respect.

Every care is taken to avoid accidents from other sources. All ropes are under the personal supervision of an expert, who examines every rope one or more times every month. Some ropes are examined weekly.

Of late years, all wagons have been constructed of steel, with continuous draw-bars, and with hooks and links of best material.

A person is specially appointed to make a monthly examination of the bridges, with instructions to report at once to the manager anything he considers necessary to be done. Of late years no suspension bridges have been constructed, but a general type of trussed bridge has been adopted. A tracing of this I beg to hand in. (Figs. 12 and 13, Plate VII.)

During the past two years a written report has been made by the underground foremen of any places that may be found dangerous.

I consider that the bargain-taker is the best and most likely person to daily, and even hourly, know the state of his bargain. His experience of it dates from the first day he worked in it; he has seen how every shot works, and knows all the weak places (if any) in it.

To avoid accidents generally, I believe the most important thing is that every man should feel that he has his duties, as well as the management, and should endeavour not only to secure his own safety, but that of his fellow workmen, by carefully complying with such rules that experience may suggest as needful.

During the past 18 years—1875 to 1893—there have been at the Llechwedd Quarry two fatal accidents from falls of rock from roofs, none from pillar-sides, and one from a fall of rock from the working face of the bargain.

Notwithstanding the fact that the workings have been going deeper, I am glad to say that during the past four years, although there has been work in over 100 bargains, no accident—fatal or otherwise—has happened from falls of rock from roof or pillar-sides.

Mr. C. W. Roberts.

17 Jan. 1894.

I should like to say a few words on the matter of "scribing," as it has been discussed at some length by several witnesses. The general opinion seems to place the cause of "scribing" to increased pressure as the workings extend downwards. For my part, I would say the *cause* of "scribing" was due to certain shocks from explosions on rock, under special conditions. "Scribing" has been stated to occur chiefly when the rock is large and free from natural joints, and as this state of things is generally found at the lower floors, it naturally occurs that "scribing" is more frequent there. A "scribe" having been started by a shot may under certain conditions of pressure extend itself, in the same way as a crack in the ice will. The amount and frequency of "scribing" depends, in my opinion, entirely on the nature of the rock, and the way it is worked.

Much has been said about dust in the mills, and it has been suggested that a spray of water would assist materially in reducing the tendency it has to rise in dry weather. I consider some such plan as this to be far better than ventilators in the roof, as these do not remove the dust owing to its being too heavy to rise through them, and they only act as inlets to rain and snow in stormy weather. Some eight months ago I decided to try the water spray, and pipes have been fitted in one of the mills with a view of trying this as soon as circumstances demand it. There has been at all times abundance of water available for any man to water his working place if so inclined. Doors are fitted in front of the dressing machines to prevent the dust from being stirred up by currents of air.

Every facility is given in the way of privies, there being 13 in all under and above ground, constantly flushed with a strong flow of water.

Evidence has been given that the drinking water at the quarries is contaminated and not fit to drink. For the information of the Committee, I have had the water from three different places analysed. In sending the samples up, I simply wrote and asked them to be good enough to give me an analysis of the three samples. I said nothing about them, or where they came from. No. 1 is a sample from a place underground, from which the men obtain their drinking water. No. 2 is from a well on floor 2, and No. 3 is from the water that is used in the dining-rooms. Carbonate of lime is reported to be "exceedingly abundant" in one of the samples, and the presence of this carbonate of lime, I take it, is a great advantage in a country like this. It is a water that is very much used by the men. Buckets and things are put there to catch it.

3590. (*Chairman.*) Which water is that?—The No. 1 sample, with the abundance of lime in it, which is of assistance in the formation of bone. With regard to the No. 2 sample, I may say that no special care was taken in taking it out of the well. It was simply taken out as a man might take a bucket of water from an ordinary well.

The following are copies of the reports:—

56, Hanover Street, Liverpool,
January 11th, 1894.

Analysis of sample of water "No. 1" from C. Warren Roberts, Esq., Llechwedd Quarries, Blaenau Festiniog.

	Grains per gallon.
Total residue on evaporation	28·00
The mineral salts are:—	
Chloride of sodium	Small quantity.
„ potassium	Trace.
Sulphate of lime	Abundant.
„ magnesia	Abundant.
Carbonate of lime	Exceedingly abundant.
„ magnesia	Very small quantity.
Oxide of iron	Small quantity.
Nitrates	None.
Phosphoric acid	Trace.
Lead	None.
Chlorine in chlorides	0·56
Nitric nitrogen	None.
Oxygen required for organic matter.	0·08

This water is hard, but is otherwise of fairly good quality. It is rather turbid, and deposits a considerable quantity of flocculent matter on standing. There are, however, no living organisms. It is free from sewage contamination, and may be safely used as a beverage.

EVANS SONS & Co.

56, Hanover Street, Liverpool.
January 11th, 1894.

Analysis of sample of water "No. 2" from C. Warren Roberts, Esq., Llechwedd Quarries, Blaenau Festiniog.

	Grains per gallon.
Total residue on evaporation	8·75
The mineral salts are:—	
Chloride of sodium	Rather abundant.
Sulphate of lime	Small quantity.
„ magnesia	Very small quantity.
Carbonate of lime	Small quantity.
„ magnesia	Very small quantity.
Oxide of iron	Small quantity.
Nitrates	Small quantity.
Phosphoric acid	Trace.
Lead	None.
Chlorine in chlorides	1·05
Nitric nitrogen	0·14
Oxygen required for organic matter.	0·03

This water is rather curious. The total residue is small, and the oxygen required low, but the chlorides are rather high, and there is a small quantity of nitrates. Taking the water altogether, we think, from its turbid appearance, that in its collection a certain amount of impurity has got in, foreign to the water itself. In many respects it is a very good sample of water, and from its softness very suitable for domestic uses. It may be drunk with safety.

EVANS SONS & Co.

56, Hanover Street, Liverpool.
January 11th, 1894.

Analysis of sample of water "No. 3" from C. Warren Roberts, Esq., Llechwedd Quarries, Blaenau Festiniog.

	Grains per gallon.
Total residue on evaporation	3·85
The mineral salts are:—	
Chloride of sodium	Rather abundant.
Sulphate of lime	Rather abundant.
„ magnesia	Trace.
Carbonate of lime	Very small quantity.
„ magnesia	Trace.
Oxide of iron	Trace.
Nitrates	None.
Phosphoric acid	Faint trace.
Lead	None.
Chlorine in chlorides	0·79
Nitric nitrogen	None.
Oxygen required for organic matter.	0·09

This water contains an unusually small quantity of mineral matter, and is extremely soft. A microscopic examination shows the absence of living organisms. The water is eminently suited for domestic purposes and use in boilers. It may be drunk with perfect safety.

EVANS SONS & Co.

I should like to refer to some evidence given by two of the witnesses. One of them stated, when asked what were the principal dangers to which the quarryman is exposed, that "at the Llechwedd Quarry one dangerous "thing is the path from the underground up to the "bank," and went on further in answer to questions to say that there were no steps from the "old floor" up to the top of the incline. As a matter of fact these statements are untrue. There is a stairway from the lowest workings in floor F up to floor 2. From this point it is open to daylight, and although the men do use the incline from this point to No. 5 floor, no accident has ever happened on that account. As a precaution, however, I have since issued notices warning the men not to use this route, but to avail themselves of another, equally convenient.

The same witness also stated generally that the manager only adhered to the rules in so far as they enabled him to keep clear of the clutches of the law. I consider this a most unwarrantable statement, and it is utterly devoid of truth, as are also the statements that it is known beforehand when the Government Inspector is going to visit the quarry, and that rockmen are taken on without any reference to the management.

The statement by another witness about the dangerous state of a path in the quarry is much exaggerated, and there is no more danger than is to be found in the public streets when the roads are slippery.

With reference to the statements made about inquests, I have only to say that I entirely agree with the evidence given by Mr. Robert Roberts.

I wish to correct some figures put in with reference to the number of men residing in Blaenau who received sick pay from the Llechwedd sick fund, compared with the number under like circumstances who go home by train, as they give an entirely wrong impression. I may say that my figures have been obtained from the same source, viz., the book kept by the secretary of the fund. My figures go to show that in the year 1890–91, of those persons residing in Blaenau 44 received sick pay and not 62; of those going by train, 68 instead of 40. In 1891–92, of those residing at Blaenau the figures are 51 compared with 87, and going by train 105 in place of 68. 1892–93 shows that 45 of those living in Blaenau received sick pay, and not 71; and those going by rail receiving the same pay were 67 compared with 44.

3591. (*Mr. Evans.*) What reason can you give for the difference in the two sets of figures as to the sick pay?—I cannot say how Mr. Rowland Jones arrived at the figures.

3592. (*Mr. Jenkins.*) He told us that he had obtained the figures from the secretary of the sick fund, Daniel Williams. (*Witness.*) I do not know what he asked the secretary for. I felt at the time that the figures were erroneous.

3593. It was not Owen Rowland Jones's statement, but the figures supplied by Daniel Williams?—I do not know whether Daniel Williams understood what was wanted at the time. They are no doubt erroneous owing to a misunderstanding as to what was wanted. I do not suggest that they were purposely given wrongly.

3594. We asked at the time whether Daniel Williams would give evidence himself?—Yes, so I believe.

3595. (*Chairman.*) What is the general conclusion you arrive at from the figures as to the sick fund—that the men who travel are as healthy as the men who live in the place, or what?—There are conditions that are to a certain extent against them; their having to travel up and down every day and that is especially so in the winter months.

3596. We had it from a witness yesterday that he was better off than he would be if he lived at Festiniog. He stated he had his house cheaper, and did not live in such a rainy district, and he considered himself better off by living in the country instead of the town. What do you say to that?—Very likely it is so.

3597. (*Mr. Greaves.*) You deduce from your figures that the men who live at a distance are not so healthy as those who live on the spot?—They receive more sick pay.

3598. (*Mr. Jenkins.*) That corresponds with the figures we have had as to the Oakeley Quarries, which were supplied by the secretary of the sick fund?—That I do not know.

3599. But the figures we had yesterday show an opposite result?—Yes.

3600. (*Chairman.*) When are your new roof-testing apparatus and crane appliance likely to be ready for use?—I shall be glad to give a description. With regard to the former, it is simply an apparatus to test whether a roof is sound or otherwise. The arrangement consists of a series of light rods which can be screwed or fitted one into the other. The top length has fitted to it an arrangement for fastening guy-cords to. I propose to fix a lamp—electric by preference—and on the other side a microphone may be fixed if found necessary. Attached to the top of the rod is a light pneumatic hammer. The hammer is connected in the ordinary way by a piece of india-rubber tubing, which can be worked by the operator below, and this hammer will strike the roof. The sound made by the hammer will be transmitted to the operator direct or taken up by the microphone and carried to a receiver at the ear of the operator, by which means he will be able to detect any graduations of sound. At the same time the light will throw its rays on the exact spot to be examined. I have tested at a distance of 18 miles the various sounds that can be made by tapping a wall, and it is very easy to distinguish them, and say whether it is hollow or not.

3601. And when do you think you can get that apparatus actually tried in practice?—It will be a case of a few weeks.

3602. What about the improvement in the crane?—The object of the design is to make the thing automatic. A ratchet has this difficulty; though it will hold the load while it is being lifted up, the pawl must be removed before the load can be lowered again. In order to remove the pawl the weight must be taken off, and before the load can be safely brought down again another pawl must be put into gear. In the case of a sudden jerk the pawl pin is apt to fracture, and that may happen and never be seen by anybody, unless it were taken off. In the new appliance a grooved friction wheel is mounted on the first motion shaft, and in contact with this works a similarly grooved eccentric or cam. When the load is being lifted up, neither of the wheels bite; but the moment anything happens, such as a handle coming off, the upper friction-wheel bites at once into the lower one and keeps the load suspended. It is instantaneous in its action.

3603. How would the friction wheel act when lowering?—The action of disengaging the friction wheels will put a brake into action.

3604. (*Mr. Greaves.*) It will be a self-acting brake?—Yes, automatic.

3605. (*Mr. Jenkins.*) Would that make the crane heavier to use?—It would not affect the working of the crane at all. While you are winding the block up the apparatus is not in action, but the moment a sudden strain comes on the handle it would come into action immediately.

3606. (*Mr. Jones.*) Would it materially add to the weight of the crane?—It would add to the dead weight of the crane by so many pounds of iron, but not to the working of it.

3607. Would it add many pounds to the weight?—No.

3608. A suggestion was made yesterday with regard to having a pin or a chain between the pinion and the cog-wheel; what do you think of that?—I have already referred to that in my remarks.

3609. That is what you had in view?—Yes; I do not like it at all myself. It is all very well for small machinery, but not for heavy weights. There is an element of danger in it.

3610. (*Mr. Greaves.*) The element of danger is the pin?—Yes.

3611. (*Chairman.*) Do you think it would be advantageous if the sides of the pillars could be cut by machinery?—I should think that anything that can be done by machinery is advantageous.

3612. Instead of trusting to blasting entirely, that you should cut the pillars vertically?—Yes, if it could be done with any commercial success it would certainly be an advantage.

3613. What would be the greatest depth you would want to have each separate cut?—It depends upon the thickness to be worked.

3614. Would a machine that would cut 10 feet each time be sufficient for that purpose?—Yes.

3615. With regard to ladders, I believe you have had some experience with telescopic ladders?—Yes, I think I had the first that came into this district, and they proved very beneficial indeed.

3616. Do you think that the use of the electric light in the quarries would tend to safety,—for instance, that with plenty of light at passbyes, and sidings, and inclines, accidents would be avoided?—I have found it very advantageous at Llechwedd, because it enables the men to be quite sure that they have placed the chain round the block properly. They get a very bright light to work in. Unless the block is securely fastened it is very liable to cause an accident when going up the incline. In that connexion, I should like to say a few words. A witness yesterday made a great point as to the way trolleys should be made. He objected to the trolleys with three cross-bars on the top, and he said he objected to them because the middle of the trolleys should be left perfectly free to secure the block. I have here a sketch of a trolley which I made about four years ago. In the centre it is kept quite clear, and there is a special arrangement to keep the chain from slipping.

3617. (*Mr. Greaves.*) And those are made of iron?—Iron or steel.

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3618. And they are in general use at the Llechwedd Quarry?—We have about 60 of them.

3619. (*Chairman.*) Your experience is that electricity will conduce to safety?—Yes, that is my experience.

3620. Would you mind describing what you mean by "scribing"?—"Scribing" to my mind, is an artificial way of making what we may call a "rent." There may be a want of natural joints in the rock, and the men, in blasting, cause these "scribes" or rendings in the rock, which are due to the natural properties the rock has of rending.

3621. Would you define "scribes" as rents produced in the pillar by blasting near it?—"Scribing" occurs more in the working face of the bargain. I am speaking from my knowledge of "scribing" at Llechwedd, and there is very little there.

3622. (*Mr. Jones.*) In the pillars?—Yes.

3623. (*Mr. Greaves.*) They "scribe" in this way, I believe,—the powder, failing to reach the natural joint, makes a joint for itself?—If there is no bedding joint the men put in a hole to split the rock, and if the rock is of a certain nature and the hole is not made long enough, it will very likely cause a "scribe" instead of splitting the rock. That depends upon the nature of the rock. Some rock is sharper than others, and the sharper the rock the more tendency to "scribe."

3624. (*Mr. Jenkins.*) Is there a tendency in the rock in your quarry to "scribe" without putting any hole whatever in it?—Such cases have been known, where the rock is very large indeed and there are no joints in it, and after cutting a free bottom.

3625. Is it more apt to do that in the lower parts of the quarry or in the upper?—It is apt to do it where the rock is long. It is due, in my opinion, to an absence of natural joints.

3626. You have not noticed whether it is more apt to occur in the lower part?—Yes, it is; but it is not due to pressure, if that is what you are thinking of.

3627. (*Chairman.*) It is not due to pressure?—No, not entirely, because if that was the case you would imagine it would be found in the New vein; but there it is almost an unknown thing.

3628. (*Mr. Jenkins.*) Then you do not attribute it to pressure?—No, I do not.

3629. How do you explain the fact that you cannot get a pillarage when you are cutting the eastern side of the pillar, whereas if you bore a hole at the entrance of a level where there is no pressure, you could get a good pillarage, the same as you would get in the middle of the rock? You can see pillars in the lower parts of the Oakeley Quarry where you cannot get proper pillarage, but if you bore a hole on the same line as the other holes at the bottom of the level you would get it there. How do you explain it?—The circumstances are very different. At Llechwedd it has been the practice to leave the whole of the whinstone dykes, and the walls have been tied together by a series of cross-braces, so that the whole of the walls are held together in that way. (Fig. 11, Plate IV.) The circumstances of the quarries may be different. I do not know whether they exist at the Oakeleys. I am only speaking of what I know at Llechwedd. If a "scribe" is started by a shot, lateral or indirect pressure may cause that "scribe" to extend. I think it frequently happens that it does.

3630. (*Mr. Jones.*) What about the true line of your pillaring and the true line of dip of your rock; do they coincide in your quarry?—From which plane do you mean?

3631. Does the line of "pillaring" run at right angles to the strike of the "clay slant"?—Very nearly.

3632. Do you know the difference between your quarry and the Oakeley?—No, not thoroughly.

3633. I think I know it, and that you are much better off than the Welsh Slate Quarry in that respect. Your line of pillaring runs nearly at right angles to the line of strike?—Yes, nearly.

3634. So you have no "scribing" at the Llechwedd quarry?—We do not have very much.

3635. What is the pressure above your quarry compared, say, with the bottom of the Welsh Slate Quarry?—I might give you an answer in millions of tons, but I do not think we would be much nearer.

3636. Is it greater or less than it is there?—It is far greater in the Oakeley, I should think.

3637. What is the angle of your vein,—the dip of the vein?—It averages 22 degrees.

3638. And what is it at the Oakeley?—I believe it is 32° to 35°.

3639. What is your cleavage again?—34 or 35 degrees. There is a difference of about 13 degrees between the dip and the cleavage.

3640. Is that all?—Yes.

3641. The dip of the strata is 22 degrees?—Yes, 22° is the average.

3642. What is the thickness of your vein?—About 24 or 25 yards at right angles to the bedding.

3643. Do you go lower down in the New vein in your quarry than floor B?—Yes, in another part of the quarry. The section I have put in shows the method of working to retain the whinstone dykes.

3644. Do you think, as far as your general experience goes, that "scribing" is not due to pressure?—It is my opinion that the cause of "scribing" is not due to pressure.

3645. What size are your pillars generally?—Owing to the peculiar circumstances of Llechwedd, the chambers and pillars are laid out to be 22 yards at right angles to the line of pillaring, 10 yards are taken up by the pillar, and 12 yards by the chamber, but in many cases the chambers are not 12 yards, and the balance remains in the pillar.

3646. Suppose you have a thickness on the west side of the chamber and east side of the pillar of four feet, and you put a "pillaring" hole there, do you know as a matter of fact that it "scribes" within a few inches to the top of the hole at the Oakeleys?—It is very possible, though I should not say that I know it as a fact. It is possible, because the rock is what the men call "sharper."

3647. Suppose we go exactly at a right angle to that hole, and take a piece of the same layer of rock, and make exactly the same operation there, what would be the result,—what would you expect?—I should say it would pillar better.

3648. Why?—Because a man on that side of the chamber can drill his hole on the dip of the pillaring.

3649. Let the hole on both sides be exactly on the line of pillaring, and the split be exactly what you would desire, and take simply the sharpness of the stratification,—the men know it in practice, and they will cut it out as pure and healthy as you could wish it. I believe it is due to pressure, and you know very well that pressure in stone will "scribe" at an angle of 45 degrees to the line of pressure?—(*No answer.*)

3650. I am putting line of pressure, and not line of cleavage?—It is very hard, of course, to find out where the line of pressure is.

3651. (*Mr. Evans.*) It may vary very considerably?—Yes.

3652. (*Mr. Jones.*) Do you not think that the greater "scribing" in the Welsh Slate Quarry is due to the fact that the pressure is not at right angles to the bedding there, as it is with you?—It is the lateral pressure.

3653. Does not that lead you to suppose that the real cause of "scribing" is the pressure in some direction other than at right angle—suppose we call it an unfair pressure?—If I have a piece of soft deal, with a knife I can split it, but with lateral pressure I can cause it to break or fracture very similar to a "scribe."

3654. You mean an unskilful way of cutting it?—I am referring now to the lateral pressure. A piece of wood will follow a sort of line of cleavage with a penknife, but with lateral pressure it will cut right across.

3655. (*Mr. Jenkins.*) As your pillars are cut more perpendicular, is the quarry safer in consequence?—I believe that the great factor in the Llechwedd quarry is the fact that we have no *bón*, which is, I think, a source of great weakness in a quarry. Instead of having very long walls, they are intersected by these dykes which have been left

3656. And owing to that fact, is it safer?—Yes, I believe it is an element of safety.

3657. You would require only a 25 yards ladder to reach to the top if you were simply working one vein, would you?—Twenty-five yards would in most cases reach the top.

3658. In the Old vein?—Yes.

3659. Have you worked two veins together?—No, except in one or two cases where the "hard" was very thin. The usual roof of the New vein is the "chert" or a whinstone dyke.

3660. What would be the length of a ladder from the hard underlying the New vein to the clay slant?—About 45 yards.

3661. (*Mr. Greaves.*) Then the whinstone dyke forms trusses as it were?—Yes, they are lateral cross-ties, and they are very stable in consequence.

3662. You consider a great length of opening and very long pillars a great source of weakness?—Yes, I do.

3663. Do you think if trusses were left as artificial supports it would tend to maintain the stability of the pillars? Yes, failing the whinstone dykes, an artificial rib would no doubt be a great source of safety.

3664. Parallel with the strike?—Yes.

3665. (*Mr. Jenkins.*) Do you attribute the weakness of the pillars to their length, or what?—A great deal to their depth vertically.

3666. More than to their length?—Yes.

3667. (*Mr. Evans.*) Can you give us the length of the whinstone dykes?—The dip of a whinstone dyke is to all intents and purposes the dip of the cleavage.

3668. Do they follow it in both directions?—Yes, though you do see some that are not so. In Llechwedd they follow the vein parallel with the line of cleavage.

3669. (*Mr. Jenkins.*) You will have to re-open underneath these whinstone dykes?—If a dyke comes under the vein we work the chamber in two places. We work from the clay slant first of all up to the rock line above the dyke. A yard or more is left, and a level is driven through and a new "roof" made and the chamber is re-widened. The cost of that is about the same as it would be to remove it all away, but the result is very much better.

3670. What would be the depth of the portion left there?—It would extend up to the floor.

3671. I mean the thickness of it?—They vary very considerably. You may take three yards as the average, including the slate rock on it.

3672. (*Mr. Jones.*) The whinstone dyke is three yards?—Yes, with the slate rock on it,

3673. (*Mr. Jenkins.*) And care is always taken that the lower chamber is opened underneath the other chamber and not underneath the pillar?—Certainly.

3674. Would it be a source of weakness to open a chamber under the pillars?—Yes, certainly.

3675. You arrange those chambers scientifically?—Yes.

3676. And not by rule of thumb?—No, certainly not.

3677. (*Mr. Greaves.*) With regard to the general question of roofs, and the examination of roofs, can you describe the method which you usually adopt for the examination of roofs generally?—I have the Wells light, and it is a very useful lamp. Some few years ago, however, I obtained a magnesium ribbon lamp which I have found of very great use indeed. It does not carry out everything that one wants, but it is an improvement, and can be used at any moment. I have one here now for inspection. (*The lamp was brought in and described.*)

3678. (*Chairman.*) Who is the maker?—I do not know. I purchased it from a man named Moses, in Red Lion Square, London, but he has disappeared since then, and I do not know where he has gone to.

3679. (*Mr. Jenkins.*) How long will it burn?—If a man is careful, it will go on as long as the coil lasts, say for a couple of hours. The coil is easily replaced, and they cost about 1*s.* 6*d.* each.

3680. And you find it very advantageous in many ways?—Yes, it is in daily use.

3681. (*Chairman.*) What is the price of the lamp?—I think it was something like a couple of pounds. The magnesium ribbon is very cheap.

3682. (*Mr. Greaves.*) If you discover anything wrong with a roof, what method do you adopt for making it safe?—Up to the present it has been the old-fashioned method of raising ladders. We have not had much trouble in that respect lately. There have been no accidents for the last four years.

3683. What effect has length or depth of pillars on their stability?—I answered that just now; every yard the pillar goes down renders it less stable.

3684. What do you consider would be the best mode of strengthening the pillars which become very long?—The mode I have suggested just now.

3685. In the absence of the natural cross-ties to leave some of the rock itself?—Yes.

3686. Is there any record kept in your office of the unsound places?—Yes, and of what is done to them.

3687. And of any complaints made by the men?—Yes.

3688. I believe that the crane you mentioned is not mere theory, but that it is already being constructed?—It is not theory, but I can hardly say that it has been practically tried yet, but I will try it as soon as it is ready.*

3689. We have had something said about the ventilation of underground quarries. What do you consider generally the best means of maintaining ventilation?—Do you mean artificial ventilation?

3690. Ventilation generally, in the case of the miners?—If you cannot get natural ventilation, you must adopt an artificial method.

3691. What is your experience as to that?—The best thing I have applied is a little fan working by an electric motor. It has been very successful. I think Dr. Foster has seen it, and Mr. Evans also.

3692. You think that better than a common fan?—Yes. I have known it blow my lamp out at a distance of 8 or 10 feet from the end of the pipe line which was over 200 feet long, whereas in the case of a man working a fan you would not feel any air at all scarcely.

3693. What do you consider the best form of bridge for underground working?—I have put in a drawing of a bridge. It is a trussed bridge, and does not rely upon any support from the roof. It is self-sustaining. (Figs. 12 & 13, plate VII.)

3694. Have you made any special rule as to the load these bridges are to carry?—Yes, only one loaded waggon is allowed upon them at a time. Shots are sometimes fired, and I have known cases were the tie-bars have been broken. It is a wise precaution never to allow more than one loaded waggon to be on the bridge at one time, though it is capable of sustaining a good deal more weight. Statements have been made that all I do is to keep clear of the clutches of the law. I hand in copies of some notices that I have in force at the quarry, and of that referring to explosives: every man has had a copy to put on the lid of his powder chest. The notice about the bridges was put up in the same way some years ago.

3695. We had it in evidence on the first day that considerable danger arises from the method of winding waggons from the bottom of the quarry, and it was said that there was great danger from six to nine waggons being attached to the end of the ropes. What is the length of your incline?—The longest length of rope is 560 yards.

3696. What description of ropes do you use?—We use the best, what they call "special steel wire ropes."

3697. What is the gradient of the incline?—About 1 in 2½.

3698. What is the maximum load?—You may take 8 tons as the maximum load.

3699. And what is the margin?—A factor of safety of eight, which is more than ample where the winding is at a slow rate. Where the speed is very low, a factor of six would be enough.

3700. Are any means adopted of lighting the incline?—Yes, in many places there are electric lights, especially where the waggons are hooked on to the ropes.

3701. And in your opinion they add to the general safety of the incline?—Yes.

3702. You have the electric light at the quarry?—Yes.

3703. And it is used for many purposes?—Yes, for lighting, pumping, rock-drilling, and fan-driving.

3704. And not only underground, but above?—Yes, it lights the office, sheds, carpenters' shops, and places of that kind.

* The crane was tried on February 20th and found to work very satisfactorily.

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3705. (*Chairman.*) Is it worked by a turbine?—Yes.

3706. And you utilise the water that formerly ran to waste?—Certainly.

3707. (*Mr. Greaves.*) I do not think it came out quite clearly, you said you had been connected with slate quarries for 22 years?—No, I was asked as to my experience in civil engineering.

3708. Have you an intimate acquaintance with most of the quarries in this district?—I have, extending from 1873 to the present time, with a short interval abroad.

3709. What experience have you had in the other quarries?—I have been professionally engaged in all these quarries at one time or other, with the exception of the present Lower Oakeley.

3710. Making surveys and so on?—Yes.

3711. (*Mr. Jones.*) Had you not some experience in other quarries?—Yes, I had, in Carnarvonshire, since 1873. My connexion with quarries commenced in that year.

3712. You stated just now that one great advantage you have at Llechwedd is that you have no "*bôn*"; what do you mean by that?—At Llechwedd the nose of the mountain rests on the solid ground. Had there been a *bôn* cut from the roof or clay-slant it would leave, east and west, a long length of rock of considerable depth, perhaps, which was not resting on anything but the edges of the walls. That *bôn* is subject to the various atmospheric influences, rain and frost and so on, and there is a greater weight on the top of the walls than when resting on the ground itself.

3713. Then really that end of the quarry is closed?—Yes, to all intents and purposes.

3714. And there is a mass of solid rock there?—Yes.

3715. (*Chairman.*) Your quarry, I gather from you, is safer from the fact that there is no *bôn* at the outcrop of the vein?—Yes, that is one element.

3716. (*Mr. Greaves.*) It would be your recommendation that a *bôn* should not be cut in a new quarry?—Yes, I would advocate that.

3717. (*Mr. Jones.*) You would not run the chambers up to daylight?—No, except for ventilating purposes.

3718. (*Chairman.*) Is not running chambers up to daylight a different thing to cutting a *bôn*?—I think Mr. Jones means to "roof up" to daylight for ventilation.

3719. (*Mr. Jones.*) Suppose you have a vein dipping down at a certain angle to the ground, would you work it an open quarry as long as you could clear the top, and afterwards sink down, and that is what you would want to avoid?—Yes, I do not believe in the compromise between the *bôn* and an underground quarry.

3720. (*Chairman.*) The combination of the two makes it rather unsafe?—Yes.

3721. (*Mr. Greaves.*) You do not find that the pressure, as you go down, affects the pillars in any way?—There is nothing to show it.

3722. In fact you would almost have greater confidence in working a wide opening deep down rather than near the surface?—Yes, because experience proves that it is the top floors that become dangerous from unstable pillars or roofs.

3723. (*Chairman.*) May that not be due to disintegration from atmospheric agencies?—That is not so in this case. It is closed.

3724. (*Mr. Jones.*) With regard to the electric light, what is your experience; can you use it in every part of the work of the quarry?—No, I never do advocate it for that. I do no not believe it is adapted for the practical working of the rock. A man wants to be able to put a candle at any point, in order to get the light exactly where he wants it.

3725. (*Chairman.*) Are you aware that there are quarries worked underground with the electric light advantageously?—No, I am not aware.

3726. Having two large arc lights lighting up the chamber from both sides, where a large number of men are working?—In this case we should have to move a pair of arc lights in each chamber about a dozen times a day.

3727. Ninety men were working there, and it was the only working place in the quarry?—That is, of course, very different to our quarry. Every time the blasting operations were carried out, the light would have to be put out.

3728. (*Mr. Jones.*) It would put them out, would it?—I do not say that. It would destroy them in time.

3729. What about the expense?—When you have water to generate it, it is the cheapest light you can get.

3730. For general use in the quarry?—Yes, and everywhere else too.

3731. Could you use it for the purpose of making places safe?—Yes, but only as a means to an end.

3732. (*Chairman.*) You have said you think it tends to promote the safety of the men in the quarry?—Yes.

3733. It enables them to see the dangers?—Yes.

3734. (*Mr. Jenkins.*) But what about using it for the purpose of taking down the dangerous parts?—I think it would be of great advantage.

3735. And you could apply it?—Yes, certainly, There is not the slightest difficulty in applying the electric lamp there.

3736. (*Mr. Greaves.*) You can carry your cables anywhere?—Yes.

3737. (*Mr. Jones.*) Would it answer as well as the limelight?—Yes, better. There is a certain amount of smoke there, whereas with the electric light it can be placed close to the spot you want to examine.

3738. (*Chairman.*) Do you find that surveying is satisfactory, as a rule, in the district; have you noticed that there have been mistakes made? I only put it generally?—I do not think I shall be treading on anybody's toes, if I say there have been mistakes.

3739. And have there been some bad mistakes sometimes?—Possibly.

3740. Do you think it would be of advantage to the district if there were some technical training in surveying?—Certainly I do. I have always felt that. I should like to suggest that there should be in this district one or more true north points laid down. We talk about the angle of pillaring at the quarries. It is about 15 degrees at the present time at Llechwedd.

3741. Taking the magnetic meridian?—Yes, it will be something else next year.

3742. You would advocate that a permanent true point should be laid down?—Yes, I should like to have two or three laid out.

3743. For the convenience of surveyors?—Yes.

3744. Yesterday we had some evidence given to us about a method of working underground quarries by filling up instead of leaving the chamber open—to fill it up entirely with the slate rubbish. Have you given any attention to that matter?—Yes, I have. About 15 or 16 years ago I was consulted by some people in Cumberland, and that was the system that I recommended there, and it was carried out.

3745. And is it being worked successfully there?—I know the quarries are going on.

3746. What is the name of the quarry?—The Honister quarries.

3747. Do the conditions there resemble those in this district?—No. I advocated that plan there under the special circumstances of the case.

3748. Do you think that a filling-up method could be applied to the Festiniog quarries?—No, I am certain if could not be.

3749. Why?—Looking at the suggestion made yesterday, it was meant that the whole of one floor would have to be worked away, leaving the roof, say, 50 feet above—an artificial roof for the whole of the length, which may be taken at 210 feet on the platform level of the floor, and considering that there are "bevels" and a multitude of joints, I think the probability is that the death-rate would be materially increased if the system were adopted here. The proposition was that first of all you go down to the lowest floor, say to floor 10. Then roof up from floor 10 to floor 9. Then work away the rock, leaving the slate vein above you. After the whole of that chamber has been worked away, you then begin to work the next floor, taking the rubbish from that floor to fill up the other. I think the witness said the first rubbish would have to be carried away. To think that in Festiniog you could work a chamber from clay

slant to "chert," a distance of 200 odd feet, leaving the jagged edges of the slate rock above you, is quite impracticable.

3750. (*Mr. Jones.*) What about the quantity of slate that you could turn out from that kind of quarry. Suppose you were to adopt that system at the Llechwedd Quarry, what could you turn out?—Do you mean from one chamber?

3751. From one floor; you can only work one floor at a time?—The output would be very much less than it is at the present time. It would be a very slow way of developing the quarry.

3752. Is it not your experience that quarries pay on the amount of produce that you can turn out?—Yes, to a very great extent.

3753. (*Mr. Greaves.*) You have never been to the Park Quarry?—No, but I know the system quite well. In fact, as I have already stated, I advocated it many years ago. The conditions here are quite different. The dip of their vein is 42 degrees, and ours is 22°. The thickness of the vein there is 20 yards, compared with over 70 here.

3754. You know the system perfectly?—Yes, very well.

3755. Do you know the Nantlle Vale at all?—Yes.

3756. Do you think this system could be adopted there?—I think there are too many joints myself, at Nantlle. There are such a great number of joints in that district.

3757. (*Mr. Evans.*) And there are upright joints there which would be against it?—Yes, I should think so too.

3758. You have referred to one or two points that we have had evidence upon. One matter was the path to your quarry. Would you like to enlarge upon that, and describe the paths?—I should like to state that the evidence given on that point was very incorrect, to say the least of it. It was stated that there was no path further than the Old Floor, and that the men had to walk up the dangerous incline from there to the top. As a matter of fact, the path extends to floor 2.

3759. What is the nature of that path?—There are a series of steps in old "roofing shafts." Where they are in old bargains handrails are put. (Plate I., fig. 1.) There are a series of steps for the men to ascend without going on to the winding incline.

3760. (*Mr. Jenkins.*) Does that go up the incline?—No One flight of steps is parallel with the incline.

3761. Which path are you referring to now?—The path from the Old Floor.

3762. Will you describe the path there?—Beginning on the floor 2, and going down to floor 1, it consists of a stairway for about half the distance, and in the lower half stones are laid to prevent the men from slipping, with a handrail going down the whole way from top to bottom.

3763. What is the distance from that path to the rails of the incline?—You mean to the edge of the nearest rail?

3764. Yes?—To the nearest rail the distance, I think, would be from 3 to 4 feet.

3765. Is it light enough for the men to walk up and down there without any artificial light?—One can tell the time by one's watch there, at any rate.

3766. You can do that?—Yes, and as a matter of fact, they put their candles out when they get there.

3767. (*Mr. Greaves.*) Is that path on the same level as the incline?—It starts there, but very rapidly rises above it, so that in a short time you are 6 or 7 feet above the incline.

3768. (*Mr. Evans.*) So that it is quite safe?—Yes.

3769. (*Mr. Greaves.*) As a matter of fact, has any accident ever happened there?—Never.

3770. Or anything approaching an accident?—No, not to my knowledge.

3771. Has any complaint ever been made by the men as to the path?—No, none whatever.

3772. (*Mr. Jones.*) Will you please describe that path again?—From floor 1 you go down some steps, and above the steps leading from floor B there is an electric lamp. These steps were referred to by one of the witnesses as being exceedingly slippery in frosty weather. There is moisture there which, of course, freezes in frosty weather, the same as on the road. From the top there are eight or nine steps, and then there is a flat before you go to some other steps, so that there is no danger if a man does fall, and there is plenty of light there.

3773. So that the path from floor 1 down to the bottom of the quarry has no connexion with the incline?—No, none whatever.

3774. (*Mr. Jenkins.*) When the men get up to floor 2 along the path which is by the incline, are they required to go along the incline from that point?—No, they are not. There is another way.

3775. Are they forbidden?—They are warned not to go.

3776. Is that incline double from that point upwards?—It is treble. There are three lines.

3777. Is one of those lines in a line with that pathway in the lower part?—No, but it is parallel with it.

3778. The upper part is not in a line with it, so that if a rope broke on the incline in the upper parts, would it go down to the lower path?—If the wagon kept the rails it could not, because it would go down on one side of it.

3779. Or descend in a line with it?—No, a line with these steps would strike the wall beyond.

3780. (*Chairman.*) Is there any safer pathway in the district than the one you have going down to your bottom workings?—I do not know of one.

3781. And have you visited most of the other quarries?—I have.

3782. (*Mr. Jones.*) On which side of the incline do you put the extra rails?—On the west.

3783. And on which side is the footpath?—On the east. I may say that there is no need to cross the incline to get to the footpath. There is a foot-bridge over.

3784. (*Chairman.*) Another point to which reference was made yesterday by several of the witnesses was the eight hours day,—what do you think of that question of hours?—I think the men are better off now than they would be with eight hours.

3785. You mean that they do not work eight hours?—No, not on the face of the rock, taking the year all through.

3786. (*Mr. Greaves.*) They do not work eight hours on an average?—No, I do not think so, but I would not like to pledge myself without going fully into it.

3787. (*Chairman.*) How many hours do they work now?—The whistle goes at 7.30 a.m., and a man gets to his working place at 8. He starts away again at 11.30 for his dinner. He begins to go down again at 12.30, and gets back to his work about 1, and he goes out again in the winter at about 3.30 or 4, to "*codi cerrig*," *i.e.*, to remove from the mills to the banks the slates made during the day, and if the whistle goes at 4.45 p.m. there is half an hour or so for that.

3788. You mean that he goes to help his partners for that half hour?—Yes, to take the slates from the mill to the bank.

3789. (*Mr. Greaves.*) What is the greatest distance from the dining rooms?—Some of them are a very long way.

3790. And that accounts for the long interval?—The men sometimes have to go almost half a mile,—the workings are so extensive underground.

3791. And many of them have to go up a long distance along this path?—Yes.

3792. And on an average it takes them half an hour to get to the dining room?—Yes. Eight hours from whistle to whistle would mean six hours on the rock.

3793. (*Mr. Jenkins.*) You mean the time from whistle to whistle?—Yes, that is what people generally do mean.

3794. (*Mr. Evans.*) You call it working time from whistle to whistle?—Yes.

3795. (*Mr. Jenkins.*) The men really do work during that time,—they are on the premises,—some of them generally carry the tools with them to the smithy?—Yes, they are engaged on their occupation, though not engaged on the face of the rock.

3796. Do you think that eight hours is too short for the men to work at these quarries?—I think it is too short myself.

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3797. Have you any reason to give us for that opinion?—I can give you my opinion if you want that.

3798. Have you had occasion to work the men for 8 hours at any time lately, or had you to shorten their hours when you had a drought?—There was a good deal of misconception about that. It did not affect the working hours of the men because they had other work to do in the mills. When the water was not available in that particular mill, they could prepare blocks ready for the tables, and so on.

3799. For what time were they working then?—They were working from their ordinary time in the morning until about 4 o'clock.

3800. Altogether?—Yes.

3801. Would that be much more than 8 hours?—I suppose it would not. It would be about that.

3802. What is your experience on that point. Did you produce fewer slates at that time?—It is rather difficult to say, because there were peculiar circumstances connected with it. There seem to have been peculiar circumstances connected with that, and I do not know whether I am at liberty to go into the matter.

3803. (*Chairman.*) Did you find that the men did as much in those hours as they did in the longer hours?—If every slate industry in this country and abroad went in for an 8 hours' day I should see no objection, but if you have to compete with other countries I fail to see the advantage.

3804. (*Mr. Evans.*) Then you do not think that as much work can be done in 8 hours as is done now?—I know I can do more work in 10 hours than in 8.

3805. (*Mr. Jones.*) What are the best months for the production of slates, in your opinion?—About March and September, because the atmospheric influences are more favourable.

3806. (*Mr. Evans.*) And not October?—Yes, September or October; October does not make much difference.

3807. (*Mr. Greaves.*) If the nominal 8 hours' day were established, it would practically mean 6 hours' work on the rock?—Yes, about 6 hours would be the absolute work on the rock.

3808. (*Chairman.*) You prefer letting the men have a good hour's rest in the middle of their work, rather than work 8 hours right off?—Yes, I think it would be far better for them.

3809. (*Mr. Jones.*) What is your opinion about Saturday; would you advocate 8 hours on Saturdays?—No, I do not think I would.

3810. (*Mr. Jenkins.*) Do you think that going out for dinner from a deep mine is not so much labour?—It is, no doubt.

3811. And also returning to work?—Yes, undoubtedly.

3812. Would not a man be better off if he worked that hour, and had it at the end of the day?—In theory, he might work that hour, but I am positive he would not do it in practice; he would have something to eat.

3813. Yes, they do in lead mines. They work 8 hours, and they take enough time to eat, but they do not go out. They perhaps take 15 or 20 minutes for their mid-day meal. What do you think of that system?—Very often, when you meet a man leaving before his time, he has always some excuse, so that he will always find excuses whether he takes time for his dinner or not.

3814. (*Mr. Greaves.*) Do you think a man can exert his best energies for a space of 7 or 8 hours without a break?—No; I do not think he could. Many men who come from long distances suffer considerably compared with others who live close by. There are men who start at 5 o'clock in the morning, and they have an hour's journey by train, and the same again in the evening. I do not think these men can possibly have the same ability to work, physically, as a man who comes fresh to his work from his home in the district.

3815. (*Mr. Jones.*) Have you seen men who worked for 8 hours at a stretch, and what condition would they be in?—You would have to call somebody in I am afraid.

3816. (*Mr. Evans.*) Do you think any men do work for 8 hours without a break?—No, they do not. They have a nibble now and a nibble again.

3817. (*Mr. Jenkins.*) Do the men get much daylight at this time of the year, in the morning or evening?—It depends upon the weather very much.

3818. Does not the underground workman almost live underground at this time of the year?—No, on the contrary his hours are shorter than in the summer.

3819. But he gets a good deal of daylight in summer?—Yes; but that is a circumstance connected with mining which you cannot help.

3820. (*Mr. Evans.*) Does that affect his health in any way?—I cannot say. I am not an M.D.

3821. (*Mr. Jones.*) Would you not recommend a man to go out from the workings for the sake of his health?—In many cases the men prefer to stay underground to save the labour of coming out.

3822. (*Mr. Jenkins.*) Do a great number stay underground?—Yes, a good number.

3823. How many hours would it mean that they would have to stay there in the summer months—from 7 to 5.30?—I think you will find that makes 10½ hours.

3824. (*Mr. Evans.*) But they are not at their work at 7 are they?—No. If the whistle goes at 7, they do not get underground until 7.30. I admit that some of the men start before the whistle goes, but a great many wait for the whistle, and perhaps they have a long journey to go, and it is about half an hour before they get there, and then they take off their coats and have a look round.

3825. (*Mr. Jenkins.*) Would it take them half an hour to get underground?—Not far from it.

3826. I cannot see that?—I am talking of the actual time taken to get to actual work on the face of the rock.

3827. But they would be underground much before that, would they not?—Yes, they would be under cover.

3828. (*Mr. Jones.*) You mean that they will not be with their work?—Yes, on the face of the rock.

3829. (*Chairman.*) We had evidence yesterday about fuse, and some of the men complained that it was sometimes very poor; have you found that?—Yes, I have.

3830. Is that a single tape or double tape fuse?—It is called double. I have not had the poor fuse lately. It takes the form of an epidemic, as one of the witnesses called it. At one period it was very bad, and I had to go to other people.

3831. Do you think the complaints had anything to do with the storing of the fuse?—To some extent I thought they had, and I only ordered a small quantity at a time, and kept it in a very dry place. That is a factor in the matter, I have no doubt. Good fuse, if stored for a few weeks, might absorb moisture, and I have taken the precaution to order a small quantity at a time.

3832. And things are better now?—Yes, but whether it is due to that I do not know, or whether it is due to the better quality of fuse.

3833. (*Mr. Jones.*) Had you to return fuse?—Yes. If I got a bad lot I always sent it back.

3834. (*Mr. Greaves.*) Your quarries are worked under special rules?—Yes.

3835. Have you had any trouble in getting the men to comply with those special rules?—Yes, a great deal.

3836. What steps are taken to enforce the rules?—I began by warning and so on, but I finally prosecuted a man. I think I was the first to prosecute in this district for a breach of the rules, but I gave it up afterwards.

3837. Why did you give it up?—Last time I prosecuted a man he was found to have done wrong, and he was fined a 1*s.* and I was fined 8*s.* 9*d.*

3838. And what do you do now?—It takes a more benevolent turn. He has to subscribe to the sick fund or go before the justices.

3839. (*Chairman.*) Why were you fined 8*s.* 9*d.*?—I had to pay the costs.

3840. (*Mr. Greaves.*) If a man is found to have broken the rules you give him the option of being prosecuted?—Yes, he is either prosecuted, or he makes a donation to the sick fund.

3841. (*Mr. Jones.*) Do you think you are within the scope of the Act of Parliament in doing that?—I cannot prevent the men from giving the donation.

3842. Do you think you are within the scope of the Act by inflicting a fine, which is what it practically amounts to?—I would rather not express an opinion. I have never spoken of it as a fine. The men are very much better now than they were.

3843. (*Mr. Jenkins.*) They have got used to it?—Of late years there has been a greater desire on their part to comply with the rules.

3844. (*Chairman.*) Would it not be an advantage if you had the same special rules at all the quarries throughout the district?—I certainly think so. I have already referred to that. So many men move about from one quarry to another, and they do not know what is expected of them, and this causes a good deal of trouble.

3845. (*Mr. Jones.*) Would you like to have the special rules revised?—Speaking generally, they are very good, but there are one or two points which might be amended perhaps. I should think the Government inspector might revise the rules, with a committee of experts.

3846. (*Mr. Jenkins.*) What is your experience as to the mode of working the quarries here underground, compared with the open working in Carnarvonshire?—As regards what?

3847. As regards danger?—I would rather work in Llechwedd than at some of those places.

3848. You are referring now to the Nantlle quarries?—Yes.

3849. And you say they are more dangerous than our quarries here?—I cannot say that.

3850. What is your average annual death-rate from accidents?—0·79 per 1,000 men employed.

3851. Is that for the last 10 years?—Yes.

3852. And what was it for the previous 10 years?—1·06 per 1,000.

3853. (*Chairman.*) Are you aware that the former figure is almost precisely the same death-rate as at the Penrhyn and Dinorwic quarries?—I do not know.

3854. The death-rates were 0·76 and 0·71 per 1,000 respectively at both those open quarries?—I do not know that.

3855. (*Mr. Jenkins,*) Do you think that the pillars should have a minimum width and the chambers a maximum width?—Yes.

3856. Would you fix that by law?—No, I would not.

3857. Would you make it compulsory on the owners?—The circumstances of each individual quarry differ very much. As a matter of practice I make the chambers 22 yards for chamber and wall.

3858. (*Mr. Evans.*) But it differs even in one quarry?—Yes; it does.

3859. (*Mr. Jenkins.*) But you would fix a minimum for the pillars?—I think you must leave that to the discretion of the manager.

3860. What discretion would you give upwards or downwards?—I would give it to the manager.

3861. Would you put a minimum width for the pillar beyond which the owners would not be allowed to go?—No, I would not.

3862. (*Mr. Jones.*) Have you got the dimensions stipulated in your lease?—No, we have not.

3863. (*Mr. Jenkins.*) Do you know that lessors do put them in their lease?—Yes; I believe they do sometimes.

3864. (*Mr. Jones.*) So it is left to you at Llechwedd?—Yes, it is, and it has worked very well. It is our interest of course to keep the quarry up.

3865. (*Mr. Jenkins.*) When it is put in a lease, is it put there to protect the quarry?—Yes, that is the object, but it very often defeats its own end.

3866. Would you not put a similar provision in order to protect the lives of the men?—If you can do it by means of an Act of Parliament, by all means do it.

3867. Weakening a pillar is a source of danger—you admit that?—Yes.

3868. (*Chairman.*) Do you think the present special rule relating to that is sufficient?—Yes, I do. I think it is a very excellent rule.

3869. You refer to rule 48, "He shall specify the "width of the chambers or openings in the slate vein, "and the width of the pillars between the chambers, "and shall see that the proper proportion of pillar is "not lessened as the work progresses," and so on?—Yes.

3870. (*Mr. Jenkins.*) It is left entirely to the manager?—Yes. You may specify a minimum width of pillar, but if you put it in the wrong place you are no better off than before. I consider that a fair-sized wall in the right place is better than a thick wall in the wrong place.

3871. But that suggests a great defect in the management?—That is why I want to leave it to the manager.

3872. (*Chairman.*) Do you think it would be desirable that the underground managers should be certificated as is the case in collieries?—I think it would.

3873. (*Mr. Jenkins.*) Would you put them under rules as to the workings underground?—Yes, something like the special rules.

3874. You would not put the responsibility upon them in the way of opening the quarries?—I think the responsibility should be on the manager. Of course the men have their own responsibility as well, but the opening out of the quarry should be upon some specially appointed person, such as the manager.

3875. You would not give the Government Inspector a voice in specifying the width of a chamber and so on?—I should of course be very pleased to have his opinion and advice, but if he laid down where the pillar was to be, and its width, he would be doing my work. I should be very glad to draw my salary, and let Dr. Foster do my work.

3876. You would not make a rule such as I have suggested?—I do not think it is needed at all; any manager would of course comply with the inspector's wishes as much as possible.

3877. (*Mr. Evans.*) The Government inspector can interfere at present if he sees anything dangerous?—Yes, of course, and he does so.

3878. (*Mr. Greaves.*) To lay out pillars correctly requires a considerable amount of experience?—I would not say that, but there is some experience necessary, and there is only one way of doing it—in order to get the walls into perfect line.

3879. (*Mr. Jones.*) I should like you to say a few words on what you have stated with regard to certificated managers?—Do you mean assistant managers?

3880. Managers and assistant managers.—I would not expect the same knowledge—except practical knowledge—in the case of a sub-manager. His work is more in the details. In the chief manager of a quarry you want a man with some technical knowledge not only of the work itself, but of the laying out and value of work, and of machinery and of engineering generally. He ought also to have a knowledge of course of the carrying out of works, and the management of men.

3881. What about the sub-managers?—The more they know the better, but the chief thing to my mind would be a good practical knowledge, in the case of underground men, of the working of slate rock, combined, if you can, with some knowledge of dialling or work of that description, and a man of sound common sense.

3882. Would you recommend that practical knowledge, combined with some little scientific knowledge, should be the basis of their experience?—Yes.

3883. Can you suggest any way of getting those two things combined?—I think that under the present circumstances there are now in Blaenau Festiniog technical classes which I hope will do a great deal of good. I have one young fellow in the office now that I want to train up, and he is attending the classes and taking some subjects that I suggested.

3884. You want him to qualify himself?—Yes.

3885. And do you think that would be an advantage to the quarry owners and a safety to the life of the men?—Yes, certainly.

3886. If it is properly worked?—Yes, the more efficient the staff is the better for everybody. It gives the men a stimulus to work to the same end.

3887. And it would benefit the owners as well?—Yes, I should like to see a hearty co-operation between the management and the men to carry out the rules.

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3888. (*Mr. Evans.*) Do you think he should be pretty well versed in the stratification of rocks?—Yes.

3889. (*Mr. Greaves.*) Geology in general?—No, not that. If a man has a taste for it, he will go on with it, but he ought to have some groundwork.

3890. (*Chairman.*) Is not science generally useful?—You want to train the eye to observe, and to train the hand also. One man will notice when a piece of machinery is out of order much better than another.

3891. (*Mr. Jenkins.*) By practical knowledge you mean knowledge gained by working?—Yes, the assistant manager should have that knowledge certainly.

3892. Because the chief manager depends upon him for his reports, I suppose?—Not that. He should have the eye and brain to see and know how things are to be done. I may say that I would prefer to have a rockman underground, rather than a quarryman.

3893. (*Mr. Jones.*) And *vice versâ*, I suppose?—Yes, quite so.

3894. (*Mr. Jenkins.*) Are the quarry agents in this district drawn from that class of men generally?—I cannot speak for the district generally.

3895. As to the bridges—are they constructed in your quarry according to the plan you have put in?—Not all; but those built in recent years are, and any rebuilt are replaced with bridges of that description.

3896. Are there any boards?—There is a board 8 inches by 4 scantling running the whole length of the bridge.

3897. Do you think that 8 inch is sufficient?—It is not to carry any weight.

3898. But to prevent any lumps from falling over?—Besides the 8 by 4, there is a skirting board about 8 or 9 inches deep to prevent any stones from rolling over.

3899. Do you think that is enough?—I think it is. I have never had any trouble from it. Of course, if a wagon left the rails and it was loaded with rubbish some might go over, but I have never known of a case of that kind happening.

3900. (*Mr. Evans.*) The tram is better on a bridge?—Yes, as a rule, because it is a more even foundation.

3901. And the rails can be fastened better?—Yes. There ought to be no chance of a waggon getting off the rails.

3902. (*Mr. Jenkins.*) The bridges are not suspended in any way?—No, they depend entirely upon their own structural strength.

3903. Have you had any accident at all on these bridges?—No.

3904. Not of late?—No, I do not think there have been any. I do not know of any, at any rate.

3905. You would recommend these bridges to the other quarries?—Yes, certainly, in preference to the old-fashioned bridges suspended from the roof, but these may be improved upon as well.

3906. You have a reason for recommending them?—There are many bridges which are perfectly stable to this day that have been hanging from the roof, but from an engineering point of view I prefer a structure that has got its strength in itself than to depend upon a roof which may or may not be perfectly safe. A bridge of this construction was erected some time back in Llechwedd, and I invited the Government inspector to come and see it. It was loaded with five wagons. I cannot remember the exact weight, but I think it was about 11 tons. It was a considerable weight at any rate, for I believe they were about 2½ tons each, which would make it about 12½ tons altogether.

3907. And there was the weight of the waggons?—They are included in the weight I have mentioned.

3908. (*Mr. Greaves.*) And what was the deflection?—I forget the exact figures, but it was something very small.

3909. (*Mr. Evans.*) It was not up to the breaking strain?—No, certainly not.

3910. (*Mr. Jenkins.*) How often are those bridges inspected?—They are inspected every month.

3911. (*Mr. Greaves.*) Have you a man specially told off to inspect the bridges?—Yes.

3912. And he brings in a report?—Yes, he reports anything necessary; and it is done as soon as it possibly can be done.

3913. (*Chairman.*) A good deal has been said about the want of underground privies; what do you think about that?—It is a very difficult thing to arrange privies underground; but we have one which is underground, and it is constantly flushed.

3914. How is the water brought there?—It is on the outflow level. I find the men do not use the existing privies as much as they might do.

3915. What privies have you above-ground?—We have 12.

3916. And do the men use them?—Yes, but not to the extent I should like.

3917. Do they prefer other places?—Yes, they do.

3918. (*Mr. Jenkins.*) What is your opinion about the suggestion that every thickness of rock should be inspected before it goes out of reach?—I quite agree with many of the men on that point, that if the bargain-takers are careful men and worth anything they will see after that. The bargain-taker knows the bargain from the very day he first entered it.

3919. But upon whom would you put the responsibility?—On the man himself, the primary responsibility, certainly. If you take all the responsibility from the workman in the bargain, he becomes a machine.

3920. Would you not put more responsibility on the man by making that inspection?—If you make it you take the responsibility from him, I should think.

3921. But you make him responsible also, do you not?—I do not think so.

3922. Do you not think he would take more care if he thought his thickness was to be inspected by someone under the company?—I think he would say, "This "place has been inspected, and I am perfectly free."

3923. Not "has been inspected" but "will be"?—It may be, but it does not follow if it is inspected to-day it will be safe six months hence.

3924. (*Mr. Greaves.*) Or to-morrow?—Quite so.

3925. (*Mr. Jenkins.*) Supposing a man is working the pillar, he would say, "A man is coming here to "inspect this place, and I must make it safe." Is not that the natural way of reasoning?—Of course he might reason so, but with the co-operation I should like to see—the man would do it without that. That reduces him more to a machine.

3926. But you know men who are apt to be negligent?—Yes, and they will be so to the end of their lives.

3927. Unless they are forced to obey?—And even then the tendency will be the same.

3928. (*Mr. Greaves.*) Do they test every thickness on the place?—I do not say that; but we are liable to come down upon him at any moment to see if he is doing his duty, and if he is not he will be hauled over the coals.

3929. (*Mr. Evans.*) As a matter of fact they do see that the men do their work properly?—Yes, certainly.

3930. (*Mr. Jones.*) What do you think ought to be the object a man has in view—to secure his own safety or to avoid being fined?—I should look after my own safety first, and never mind the Government inspector.

3931. (*Mr. Jenkins.*) But is not the safety of other men in the question as well?—Yes. As I have already stated, with regard to accidents generally, I believe the most important thing is that every man should feel that he has his duties as well as the management, and endeavour not only to secure his own safety but that of his fellow-workmen, by carefully complying with such rules that experience may suggest as needful.

3932. Can you hold a man responsible for an accident resulting from his own negligence if the accident happens in 10 years' time?—If the Court finds that it was his fault I presume you could make him responsible.

3933. In that case would not the owner be responsible?—I should say it would be a thing that we as mortals have no control over, under such circumstances as those.

3934. Do the two present Acts hold the owner responsible or not?—If the owner is to blame, he has to suffer.

3935. Is it not the principle of the present Acts that the owner is to enforce discipline and to see to the safety of the workmen?—I do not know what the principle of the Act is, but I know what the practice is.

3936. If that is the principle, is it a sound principle?—I believe in every man trying to protect himself and his fellow workmen as well. That is the principle I go on, and as far as I can I carry it out in practice.

3937. (*Mr. Jones.*) Do you think, as a matter of fact, it would be more expensive for a man to work his side of the chamber in a proper way than in any other way, as a matter of £ s. d.? Do you think it would be more expensive for a bargain-taker to cut his pillar in a proper way than in an improper way?—No, I do not think it would.

3938. On which side do you think the advantage is?—If I could do a thing right I would do it right, no matter where the advantage lay.

3939. But which of the two ways would be the cheapest for the men?—The cheapest in the end would be to do it right.

3940. But what about the first expense?—It would be cheaper to do it right, I should think.

3941. The natural lay of your rock is of such a character that it would be better for the man to make his side safe—to cut it in a proper way—than in any other way?—Yes.

3942. (*Mr. Jenkins.*) Would it be cheaper for the men to bore three holes than it would be to bore one?—That depends on the length of the three.

3943. But supposing the three are equal to the one?—If the three are a yard each it will take longer than to bore one of a yard.

3944. Which would be the cheapest, to bore three holes of one yard each, or one hole of one yard?—One hole of a yard long.

3945. Suppose the nature of the rock requires three holes instead of one to make it safe?—Then it confirms Mr. Jones' view.

3946. Which would be easier to make, the three or the one?—The easier would be to make it unsafe.

3947. Would it be cheaper?—It would be cheaper to bore the three in the end. If the man is engaged by the day, and is going off to America to-morrow, it would not hold good; but if he is going to work the bargain through, it is easier for him to work it safely and properly. Some remarks were made yesterday about inspecting the mills and machinery, and as to the men having to do repairs themselves. My experience is that this is not the fact. No man is expected to repair his machinery. There is a special man to do that kind of work.

3948. (*Chairman.*) Except trifling matters, I suppose?—Yes, quite so. If the man wanted to put a bolt in, he would get a bolt and put it in.

3949. And would he tighten up the belting himself?—Yes, certainly.

3950. He would do any repairs that he thinks would be very trifling?—Yes, certainly; but you can hardly call them repairs. They are really renewals.

3951. (*Mr. Jenkins.*) Men are generally kept for the purpose of repairing the machinery?—Yes.

3952. (*Mr. Evans.*) Are the men in any danger when they put the straps on the pulleys?—No. That is a badly drawn picture very highly coloured. In the older mills there are planks laid across to enable the men to pass along to put the belting on to the pulley. In all cases, the machinery is stopped while they are preparing the things, but in the newer mills there are ladders to put up against the shafting. I have often done it myself, and it is perfectly safe.

3953. At a right angle?—Not quite; but very nearly so. The new system is to put the pulleys so close to the main beam that a man may put his ladder there, and so reach the pulley to put on the belting.

3954. And there is no difficulty?—No.

3955. (*Mr. Jones.*) You use the ladder on the off side of the shaft?—Yes. There is no danger at all attached to it, and a man would have to go out of his way to get hurt.

3956. (*Mr. Jenkins.*) What does he stand on?—On the ladder. In the older mills he can stand on the plank. I use a 15-inch pulley to drive a pair of tables, and an 8-inch pulley to drive a dressing machine.

3957. (*Mr. Greaves.*) The strap is on the shaft loose?—Yes, the pulley is on the shafting.

3958. It is always on one?—Quite so, and it is very easily fixed.

3959. (*Mr. Jenkins.*) You do not know of any dangerous parts in your quarry which are worked at present?—I do not. Directly they are found dangerous they are stopped.

3960. We have had it in evidence that a certain place which had been stopped was re-started again, and that a man was killed there. Do you know anything about that?—Was that at Llechwedd?

3961. Yes, I believe we have had evidence to that effect; but I do not know whether you were at Llechwedd at the time?—I have no knowledge of that. I may say, with regard to ambulance work, that copies of the St. John Ambulance handbook were given out, and a large number of them distributed amongst the men in the quarry for their use in cases of emergency.

3962. (*Mr. Greaves.*) The books were printed in Welsh?—Yes.

3963. And distributed?—Yes, on different floors, and in the mills.

3964. How long ago is that?—I should think it is four or five years ago.

3965. And have you a proper stretcher in the quarry?—Yes.

3966. And other appliances?—Yes.

3967. And bandages and so on?—Yes, complete ambulance appliances.

3968. (*Mr. Jones.*) And where do you keep them?—I keep them in the engine-house, where it is always dry.

3969. Do you keep them in more than one place—the appliances for stopping bleeding?—We have none of those. I was referring to the ambulance stretcher.

3970. Would you recommend that some of those appliances should be kept?—If the men would only avail themselves of them we should be only too pleased to do so.

3971. (*Mr. Greaves.*) And in various parts of the quarry?—Yes.

3972. (*Mr. Jones.*) With regard to the electric light, can you give us any figures that will enable the Committee to know the approximate expense of that light, say, in respect of the plant to begin with, and also the expense of maintaining it?—Given an available water supply you can fix up a plant, we will say, of 25-horse-power (taking that as a figure for the sake of illustration), at a cost, I should say in round figures, of one-half the amount required to obtain the same horse-power by steam.

3973. (*Mr. Greaves.*) If you have water power?—Yes, available water power. If you want to distribute that electric power over a large area, you can do so with a loss small in comparison with compressed air. You will get an efficiency of 70 per cent. with electricity, where you would only get about 25 per cent. with compressed air.

3974. (*Mr. Evans.*) Do you lose much of the power by transmission?—There is a certain amout of loss, but it is less than by any other means.

3975. (*Mr. Greaves.*) You say the efficiency is 70, as against 25?—Yes.

3976. (*Mr. Jones.*) As compared with compressed air?—Yes.

3977. And that is the best thing you can get outside electricity?—Yes. Supposing I have 100 horse-power at the dynamo, I get 70 per cent. at, say, half a mile off, if the plant is properly designed, whereas with compressed air I should only get 25 out of the 100.

3978. And the expense of the plant, is how much?—I would put up a turbine working, on a fall of say 50 feet, at one-half the cost, or probably less, of putting up an engine and boiler of the same power.

3979. And what about the cost of maintaining it?—My experience of it for the last three years is that, so far, it has been hardly appreciable. The only wear has been on the commutator of the dynamo, and that is not the 32nd part of an inch.

3980. (*Mr. Evans.*) What about steam for that distance?—You could not do it,—in fact the steam would be condensed. You could get hydraulic pressure, but then you would have trouble with that

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3981. (*Mr. Greaves.*) Another great advantage of electricity is the facility with which you can conduct the wires from place to place?—It has every facility in that respect.

3982. (*Chairman.*) Is there a large amount of available water-power going to waste in this district that might be used in that way?—Yes, hundreds of horse-power every day.

3983. And every day in the year?—Yes.

3984. (*Mr. Evans.*) Is electricity quite as manageable a power as any other?—Certainly it is. It can be managed easily, a man does not want a special training to look after the electric machinery in the quarry. Of course you will want an expert now and then to renew something, or to do any particular repairs, but for the ordinary working of it you want no more skilled labour than you do for the engine-driver, and not so much.

3985. And you can use it for sawing purposes?—Yes.

3986. And for winding purposes?—Yes, for any purpose you like.

3987. (*Mr. Jones.*) I believe you have a hospital in the district?—Yes.

3988. Can you give the Committee any account of that institution of yours?—Formerly the Llechwedd was acting in connection with the Oakeley Hospital at the time of the existence of the old Welsh Slate Company, and there was a *pro rata* arrangement as to expenses. After the Oakeley Company absorbed the Welsh Slate Company, there was not exactly room for everybody in that hospital, and so it was taken for the use of the Oakeleys; Messrs. Greaves, knowing the advantage of a hospital, established one for the use of their own workmen.

3989. And what is the result, so far as the patients are concerned?—As far as I know, they find it of very great assistance to them. They have their apartments there free, with their living, and anything the doctors say they require is given to them.

3990. (*Chairman.*) Are the expenses entirely paid by the proprietors of the quarries?—Yes, entirely—every fraction.

3991. The men do not contribute anything?—No, nothing but the 1*s.* a month, which they pay to the fund whether they are ill or well.

3992. (*Mr. Jenkins.*) They provide for their own doctor, of course?—Yes.

3993. And towards that the men pay the 1*s.* a month?—Yes.

3994. (*Mr. Greaves.*) Is that institution readily and willingly used by the men?—Yes, there is a better feeling than was the case in former years. Many of the men prefer to go home, but most of them prefer to go to the hospital when they are seriously hurt.

3995. (*Mr. Evans.*) You find it a great advantage to have a hospital close by?—It is not very near. It is in Market Square.

3996. But it is in the neighbourhood?—Yes, as near as we could get it.

3997. (*Chairman.*) Are some of the men sent to the sea-side at times?—I tried to get them, in conjunction with the firm, to subscribe a certain sum, which would only come to about 6*d.* a year per man, to secure a certain number of tickets which would pay for their maintenance for three weeks. At that time the sick fund was not in a very prosperous condition owing to the influenza entailing heavy calls and one thing and another, and the men could not see their way to take it up. Now, a per-centage of the subscriptions is added every year by the Messrs. Greaves to enable any man who may require it to go to a Convalescent Home.

3998. (*Mr. Greaves..*) Does any other quarry except Llechwedd and Oakeley provide similar accommodation?—I am not aware of any, further than what Mr. Roberts told you to day—that men from other quarries were allowed to use the Oakeley Hospital on an understanding with the quarry people.

Mr. N. F. Robarts.

Mr. NATHANIEL FRANCIS ROBARTS examined.

3999. (*Chairman.*) You live in London?—Yes.

4000. And you are the managing director of the New Welsh Slate Company, Limited?—Yes.

4001. How long were you a director of the late Cwmorthin Slate Company?—From 1885 until the company went into liquidation.

4002. And since then you have been managing director of the present company?—Yes, since the new company was formed in July 1889.

4003. I believe you have some suggestions to offer to the Committee with reference to the management of slate quarries?—Yes. One point has been on my mind for some years, and that is the question of certificated managers. I believe that this question has already been referred to by some of the witnesses. I think the development of slate mining in this district, and the deeper mining which is going on, make it advisable that the slate quarry managers who are appointed in future should receive Government certificates in the same way as is the case at present in collieries, such certificates not to apply to those who are in management prior to the passing of any new Act applicable to slate quarries. I consider that the time has now come when we might expect more scientific knowledge on the part of the management than heretofore. For instance, I would suggest that all managers should be capable of mine surveying and making plans of quarries; that they should have some knowledge of geology; some practical as well as theoretical knowledge of steam-engines and machinery; a knowledge of water power, and some knowledge of electrical engineering. I do not want to cast any reflection upon the present managers, but with the spread of education I think that this knowledge might be fairly required in the case of all managers appointed hereafter. There is one other point which I wished to bring before the Committee and which I thought might be useful to them. I have prepared a statement of the age of the men employed in our quarry, as I thought it might have some bearing upon the evidence which Dr. Jones gave here. Unfortunately by error I have left those figures in London, but I will forward them to the Chairman later on. (Appendix VI.) With regard to those figures, I should like to point out that as there has been a change in the management at the quarry, it is possible that the average age may be less at our quarry than at other quarries in the district. Some of the older men may have left the quarry under the new management and been replaced by younger men. The average age of the men who have come on since the 1st January 1893 is very considerably less than the average age of those employed at that time.

From matters which came up yesterday and to-day, I should like to bring two or three matters before the Committee. In the first place I shall refer to the accidents at the quarry which I believe are considerably above the average for the district. We have had during the last four and a half years four fatal accidents, and I wish to call attention to them as showing what may be attributable to the management and what to the men themselves. One was the case of a man who was riding on a waggon against the rules, another was a fall of ground from a height of 4 feet in a roof where a man was working. The third accident, in which two men were killed, resulted in the prosecution of our manager for a breach of special rules, but the prosecution did not succeed, so that I may take it that no liability was brought home in the way of mismanagement. Those are the only four fatal accidents in four and a half years, though of course it is a high average for the number of men employed in comparison with the other quarries. A statement was made yesterday by one of the witnesses to the effect that our company had admitted liability by some payment they made to the relatives of one of the men. The facts of the case are these, shortly after the accident, and before it was known that any action was going to be brought, our board voted a sum of money to the relatives, but as an action was brought by the relatives of one of the men the money was not paid, as it might be considered an admission of liability. Consequently they lost that opportunity of receiving the money, and ultimately the parties who brought the action compromised with the insurance company for 15*l.* It was against the wish of our company that this compromise was come to by the insurance company, as there was no liability, and we wanted to have the case fought out.

Our other accidents—the non-fatal—have been 20 in the four and a half years, classified as follows:—Explosives, 3; putting hand in machinery, 1; crane handle, 1; chains breaking, 2; falls from roof or pillars, 6; moving or splitting blocks, 2; slipping when working, 1

shafting, 1; waggons, 2; and 1 cut finger from slate rock, I think. I consider that all these 20 accidents may be put down to causes which are not attributable to the employers. I mention these figures in order to show what a very small amount of liability there is, even in a quarry which has a bad record by reason of the number of fatal accidents. I attribute the high average of fatal accidents to our ground being very disturbed, having a good many faults and "bevels" and so on, so that we are obliged to work our chambers only 10 yards wide, and we have a great deal of trouble with our roofs. This is especially the case since the fall took place about 1884 or 1885, which has led to a great deal of water coming down in parts of the quarry. During the last few weeks, for instance, we have suffered very severely from bad roofs, which I cannot help thinking has arisen from the very heavy rainfall in November and December, when we had seven weeks' rain without intermission.

4004. (*Mr. Evans.*) What was the rainfall in that period?—I have not the figures with me. Our rainfall is much higher than it is at the Oakeleys. I have only kept a rain-gauge since last May, but I have compared it for that period with the Oakeleys, and ours is about 20 per cent. higher. Theirs is about 100 inches per annum, and I expect ours will be about 120 inches, based on the figures since May last. I shall have to send the Chairman the figures since May last when I furnish the other figures.

There was also something said yesterday about a pillar in our B. south floor having been cut to a width of 4 yards. There are some pillars which have been cut very narrow indeed, but that was before the present company was formed. I cannot speak about that, but I can say very positively that nothing of the kind would now be done, or anything made less than 10 yards. We have a surveyor, who is independent of the manager, and who surveys the place, and it would be his duty to report if he found anything being cut in that way. Of course it is necessary sometimes, where the ground has "bevels," for the safety of the chambers to reduce the pillars below their normal width, but it would only be done for the safety of the men working there, and not for the sake of getting slate.

4005. (*Chairman.*) Do you think that in the case referred to it was done for that reason?—I would rather not express an opinion. It happened before my time.

4006. Are the chambers in any way in danger by these pillars?—Yes, I should think that might be the case in some instances, and we have had to abandon one or two chambers in consequence. Of course, as freeholders, it is greatly against our interests to weaken our pillars. It might endanger the future existence of our quarry. It is otherwise in the case of a leasehold quarry. Lessees might try to work their quarry out in the term of the lease. We have, in one or two places, left barriers so as to prevent a fall from the upper workings coming down to the lower.

4007. (*Mr. Greaves.*) Have you found those barriers efficacious?—Yes, we have had none of our falls coming down to the lower part of the quarry.

4008. And if the barriers had not existed you would have had?—Yes, I believe so.

4009. They were left for the express purpose of maintaining the roofs and pillars?—Yes, that was done by the old company. Then, again, with regard to the cranes, I introduced one some years ago with a pawl, but the men would not use it, and I have had no more. I thought it might be a safety myself, but, of course, there is a difficulty in it when you want to reverse, you then have to lift the pawl, but I cannot help thinking that if I was working I should prefer to use it rather than do as they do at present. With regard to chains, we have had two accidents, as I mentioned just now, from the breaking of chains. These chains are the men's own property, and I think they should use more care in seeing that their chains are safe. I saw one case where a man fell from a considerable height and might have been killed. His chain was unfit to use, and I should have been very sorry to have trusted my life to it. With reference to fuse, we have had the same complaint as Mr. Warren Roberts. We have had fuse from one maker which was bad, and we have tried several makers and had several complaints about them. Possibly it is due to the fuse being kept too long, and now we order only small quantities at a time.

4010. (*Chairman.*) And have things improved since?—No, I do not think so. We had some fuse a few months ago by a very good maker, which was very troublesome. We are now trying another maker, whose fuse we had given up before.

4011. (*Mr. Evans.*) It would not be safe perhaps to give the names of the makers?—I would rather not name them. They are the two or three best makers. Of course it is our advantage to pay double the value of the fuse rather than to have time wasted over a mis-fire.

4012. (*Chairman.*) Is it single or double tape that you use?—Single tape.

4013. And what does it cost per coil?—About 3*d.* net. With regard to candles, we have made various trials of candles from different makers. Of course it is our interest to have the best, as we can have most work done by them. We are now buying an expensive candle, but we find it is the most economical.

As to the ropes and ladders, ours are used by one gang only, who are responsible for their being in good condition, one man taking charge of the gang. As to the the trucks, all ours have the four cross-bars, but all our new ones would be the steel ones which Mr. Warren Roberts referred to. We have had one as a trial, and find it is the best. With regard to light in examining the roofs, I have endeavoured to get the magnesium lamp. Mr. Warren Roberts kindly gave me the address of the missing Moses, but I have not been able to trace him. I have put the matter in the hands of one of the principal opticians in London, and shall be glad to get one of those lamps if I can. As regards the walking up and down the incline, of course it is against the rules except at stated hours. If our list of accidents is taken, I think it will be found that for many years past there has been no accident upon the incline, except the man who rode in the waggon, which is against the rules, and who struck his head. Therefore the danger from this source is, apparently, not great. Our trains go up about once every 15 minutes, and they take about three or four minutes to go up, but they will work faster than that. With regard to the remarks of Mr. Robert Roberts as to the Oakeley Hospital, in which he said he thought we sent men to the hospital, I believe the Cwmorthin Company did so sometimes, but the present company have not made use of it at all. I should be very glad to have some hospital to which the men might be sent. We have had to give them assistance in nursing when they go to their own homes, and we paid a considerable sum a few months ago for nursing, so that it would be very much better to have a hospital where we could send the men if they were willing to go.

I have only one other point to which I would like to refer, and that is with respect to a question which Mr. Jenkins put to one of the witnesses yesterday. It was a question as to what I said before the Labour Commission with regard to a witness who was here yesterday. Mr. Jenkins intimated that I said before the Labour Commission that that witness had left our quarry voluntarily. I think if my answer is read with the context, it will be found that that was a wrong inference. I said we had not re-engaged him at the end of his month, and that he was out on strike pay in consequence.

4014. (*Chairman.*) Have you any barracks belonging to your company?— Yes, we have three. Recently the Local Board have given us notice that not more than a certain number of men should be allowed in each, which would rather reduce the number of the men living there. I think the result will be that we shall close these barracks and let them as cottages. I do not think they will pay as barracks.

4015. What do the men pay at present for them?—I forget now what the figure is. They will pay us better as cottages, and they will be kept in better condition. They are spoiled and neglected as barracks.

4016. Would it not be better to have separate pathways from the incline for the men to go up and down, as at Llechwedd?—Yes, I think it would. There is no doubt a certain element of danger in going up and down. We have just put up a telephone on the longest incline from top to bottom, and when a train is on the line we might have an electric bell ringing, so as to give the men warning of it.

4017. Would it not be possible, without any very great expense, to have a separate pathway?—It would mean a separate sink in the New Floor.

4018. But afterwards?—It would be no great expense after we had worked the first chamber out, but it could not be made until the chamber was worked out. It

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would mean a considerable expense in sinking a separate shaft. As I have pointed out, we have had no accidents on the incline except from breach of rules.

4019. We have had some evidence about the 8-hour day; what are the hours at your quarry?—They delay a little when the mornings are dark, and the bell does not ring until there is a fair light, often as late as 8 o'clock. From December to the 1st February, roughly, it is from 8 to 4.30; from the 1st February to the 1st March, 7.30 to 5; from the 1st March to the middle of October, 7 to 5.30; and from the middle of October to December, 7.30 to 5.

4020. What interval is allowed for meals?—Half an hour, nominally.

4021. And what does that mean in practice?—They are supposed to have from 12 to 12.30 for their dinner; but taking our south sink, they have to go up four floors to the place where most of the men take their dinner. Then they do not leave until the bell rings again, so that really from the time they leave the lowest working until they get back again it is pretty well an hour. A good number of the men, however, do not come up at all. They take their meals in their bargains, and perhaps they take very little more than their half hour. In the mills the places for dining are handy. In our lowest mill there is a place for them to take their meals, and in the upper mill they generally go into the machine-house, where they can get hot water.

4022. Have you many men working at your quarry who live at a distance, and who travel daily by train?—Yes; but we have a considerable number of cottages on our ground, and a great many live there. I have never gone into the figures as to the proportion of men who live away.

4023. Do you think the men who travel daily by train are liable to suffer in their general health in consequence?—I should think it would be injurious, say, on a wet day like to-day. There is half a mile walk to the station, and they often sit there in their wet clothes for a long time, and afterwards travel down in a close carriage to Penrhyndeudraeth or Portmadoc. I cannot help thinking that such a practice must be very injurious. I can say that personally I should like to live in a cottage close to my work, and not be obliged to leave so early in the morning,

4024. (*Mr. Greaves.*) You have referred to certain barriers which you leave at the quarries. Do you find that the ground is more troublesome above or below?—Above. It was very much shaken with the falls eight or ten years ago, and water comes through the cracks.

4025. So that you find your quarry very much more stable and safe below the barrier?—Yes, certainly.

4026. Do you find your pillars more solid deep down?—On the whole we find the ground getting better as we go down. Our rock is getting larger, and we consider the property is improving as we go down.

4027. And the roof causes you less trouble?—Yes.

4028. Are there any intersecting greenstones in your quarry?—No.

4029. You would advocate the formation of those barriers when the pillars become a very great length?—Yes, I quite agree with what Mr. Roberts said this morning, that a barrier is a great advantage. We have sunk in our south vein to floor D, which we are beginning to open, and our shaft is down to E, and it is very likely that we shall leave a large part of our floor D unworked.

4030. For the same reason?—Partly for the safety of the workings, and partly because it will pay us better than to work our floor D. We are only working D at the moment to give us ventilation to assist floor E, but we have not decided yet finally what to do in future.

4031. I believe your quarries are worked under the special rules?—Yes, under the most recent ones.

4032. Do you think it would be of advantage if all the quarries of the district worked under those rules?—Yes, it would certainly be more convenient.

4033. Do you find a difficulty in enforcing the rules at your quarry?—Yes. We prosecuted once or twice, especially with regard to the tamping; we prosecuted lately, and there was a very nominal fine. It happened when I went round the bargains myself. I saw it and could not pass it over.

4034. With regard to the examination of roofs, you use the usual method?—Yes, we have a Wells light, but I do not think the manager uses it, but we use a flare light. When any roof is thought to be at all dangerous we have it examined by a special gang.

4035. Do you keep a record of those occurrences?—Yes, we have kept a record of all since we adopted the special rules.

4036. Do you supply the chains, or do the quarrymen supply them themselves?—We supply them. They are tested chains, but we do not see how often they are renewed. We leave that to the men. Of course I cannot say that we have supplied all the chains that are in use. We do supply them, but the men are not obliged to buy from us, and can buy them elsewhere if they like.

4037. Have you any bridges?—Yes.

4038. Which, the under-truss or suspension?—We have no suspension.

4039. They are all under-truss?—I think so, but I cannot say for certain.

4040. You have one dining room?—Yes, for the lower mill.

4041. And how many men will that accommodate?—It will take all the men in the mill.

4042. Do the men appreciate that dining room and always go there?—Yes, they always go there.

4043. In your opinion dining rooms are desirable at a quarry?—Yes. Of course for the underground men to come up it would be rather difficult, but for the above-ground men it is not so.

4044. You say you have no separate path apart from the incline?—No, except in one sink for two floors.

4045. But you have refuges?—Yes, every 50 yards. We are bound to have them under the special rules.

4046. You agree that it is desirable, where possible, to have a separate entrance to the quarry?—Yes, quite.

4047. (*Mr. Jones.*) You say you pay 3*d.* a coil for the fuse?—Yes.

4048. Do not you think you are running it rather fine, and getting a poor quality?—That is the usual quality used in this district, I believe, 5*d.* fuse, with 40 per cent. off.

4049. Do not you think it is rather a poor quality?—I think it is used universally, as far as I know. The men never complain in that respect. We would use a more expensive fuse if we thought there was any advantage in it. I find that a good fuse is the cheapest.

4050. (*Mr. Evans.*) Have you been trying the double tape fuse?—No, I do not think we have. We have used at times Tangye's fuse, which has a metallic coating.

4051. The safety fuse?—Yes, we have used that in damp places.

4052. You have not got the figures with you as to the ages of the men, you say?—No. Unfortunately I left them at home, but perhaps I can answer any questions you may have about them.

4053. If you will kindly send them to the Chairman later on they may be useful?—Yes, I shall certainly do so, but you must take them with that slight drawback, that we have had a change in the management, in consequence of which many of the older men left us, so that the average age may be a little lower than it otherwise would have been.

4054. (*Mr. Jones.*) With regard to the barrier you have referred to, would you have left the barrier if you did not happen to have a fall?—That was before my time, and therefore I cannot say anything as to the condition of the rock at that time.

4055. (*Mr. Jenkins.*) As to your evidence at the Labour Commission, were these your words:—"Four "men left our quarry at the end of their term of "employment; we did not re-engage them." That was part of your answer to question 9415. Were those the words you used on that occasion?—It was part of my answer, but you must take it with the context.

4056. Then I will read the question and the whole of the answer. "Have you any other matter that you "desire to state?"—"There is one point with regard "to the evidence which the secretary of the union "gave. He alleged that certain men had been boy-"cotted by the managers in our district. He alluded "to men who had left our quarry last year, he did not

" name our quarry, but he alluded to certain men who " have, I believe, been upon strike pay since. Those " men have not been boycotted by the other managetrs " and the other managers have publicly denied any know- "ledge of any conspiracy or understanding whatever " as to not employing them. Four men left our quarry " at the end of their term of employment; we did not " re-engage them. Two of those at once went into " another district and never sought employment. One " of them sought employment. I do not know whether " he has obtained it. Another one sought employment, " and he has been publicly challenged to deny that it " was offered to him, but he has not gone into work. " They have no doubt tried to create ill-feeling amongst " our men." That was the whole of your answer, was it not?—Yes.

4057. You used the words " left our quarry " twice in that answer?—Yes.

4058. Did you intend to give the impression that they had been dismissed?—Certainly; that I did not re-engage them. You must take the whole answer.

4059. Is not the natural inference from these words that the men left of their own free will?—I must leave everyone to draw his own inference.

4060. That is the true meaning, is it not?—No, I do not think it is.

4061. (*Chairman.*) What wages do your men get on an average; are they able to live comfortably?—The earnings of the bargain-takers last year averaged 5*s.* 4¾*d.* per day, or 32*s.* 4½*d.* per week. Taking the men all round (bargain takers included) the average was rather over 4*s.* 4*d.* per day. It came to 26*s.* 0½*d.* per week.

4062. How many men do you employ altogether at your quarry?—About 280 or 290.

4063. (*Mr. Jones.*) You said the wages " all round " averaged 4*s.* 4*d.* per day; do you include the boys as well as the men?—I think the boys are each taken as half a man in that calculation. It is not my calculation. We get it from the quarry in that way. They reckon two boys as being equal to one man.

4064. How many boys do you employ altogether?—From 10 to 13, I think.

4065. (*Mr. Evans.*) Do the bargain-takers employ other men to work with them?—Yes, they employ journeymen.

4066. And do your figures include those journeymen?—It is what the bargain-taker earns himself after paying day wages to the journeymen at the scale of day wages. The scale is 4*s.* 2*d.* per day for the journeymen. The bargain-takers thus get 5*s.* 4¾*d.* per day themselves.

4067. (*Mr. Jenkins.*) Would you approve of the suggestion to put these slate mines under more stringent inspection?—I do not know in what way it is required.

4068. Would you approve of appointing an inspector under Dr. Foster to help him to carry out his work?—If he is not able to do the work I see no objection to giving him assistance.

4069. You know as a matter of fact that sub-inspectors have been appointed under the Coal Mines Act and the Factories Acts; would you approve of the appointment of a sub-inspector for these quarries?—If there is the same necessity as in the collieries where the chief inspector is not able to visit them frequently owing to their being so numerous.

4070. You know the area of Dr. Foster's district, and the amount of work he has to do; what is your opinion in view of that?—As far as our acquaintance with Dr. Foster's inspection goes, it is efficient in every way.

4071. Would you approve of making a more minute inspection of the underground workings—the roof and pillars?—By the inspector, do you mean?

4072. No, by an inspector under the company or by the officials?—I do not think there is any need of it.

4073. You do not believe that the men are rather apt to be careless in carrying on their work?—We have a special gang at our quarry for repairing roofs, and it is their duty to see that all roofs to which they are sent are made safe before they leave them. It is the duty of the bargain-taker to work the bargain properly, and to have regard to his own safety and the safety of his men. The bargains are visited twice a day by the agent, and I think that is quite sufficient.

4074. Do they go to the bargain and examine it thoroughly at any time?—I will not say that they go to the upper part of the thickness at all times, but they go into the bargain and speak to the men, and if the men have anything to say they have an opportunity of saying it.

4075. And they rely upon the men's word?—Yes, largely, and it is the men's duty under the special rules to call the attention of the manager to anything which they think is dangerous; and if the men do not do that, they are guilty of a breach of the rules. I refer to Rule 42. " If the air be slack, so that candles will not " burn freely when placed upright, or if he perceive " any unusual quantity of water, or any insecurity of " roof, sides, or other parts of the workings, or any " accidents to the machinery, or his inability to per- " form his proper duties from any cause whatsoever, or " any breach of the Acts or of these rules, or anything " that may appear unsafe or likely to produce danger, " he shall forthwith report it to the manager, assistant " manager, or foreman in charge, who shall not allow " work to be resumed, save in cases of emergency, " until proper ventilation has been restored or the " place made secure."

4076. But suppose a man does not say anything to the manager, how is the manager to ascertain that the place is safe?—The manager is responsible, and I think you must leave the responsibility upon him. He must be prepared to defend himself in case any accident happens. He must be able to show that he has paid due attention to the work, and that he has not neglected his duties. I should be very far from removing responsibility from the manager, and placing it on a Government official.

4077. But the main object should be to secure the safety of life and limb in all cases?—Yes.

4078. Therefore, should there not be care taken to see that the men do their duty properly when they are working their bargains, and not rely upon their informing the manager?—I maintain that there is care taken. The managers visit the bargains, and see that they are safe, as far as they can be made safe.

4079. As far as they can see, is it not, from the bottom or top of the bargain? Do they go up to examine the sides?—At times.

4080. Do they do it regularly or periodically?—No, I will not say that they do it periodically.

4081. Would you approve of that being put in a rule as a new requirement?—Will you define exactly what you want done before I answer that question?

4082. That the manager or someone under him should go through the bargain and see that every part of the pillar and side is safe before it goes out of reach, say every " thickness "?—Supposing that such an examination was made after each " thickness " was worked, before it went out of reach, if that was to throw the responsibility upon the manager hereafter of any accident that might happen, I should say not, because the pillar may vary considerably after another " thickness " or two is worked, and if it is brought home to the manager that this accident has happened, and it is proved that it was a fall from the pillar, and an inference is to be drawn that the manager did not properly inspect, I do not think it would be an improvement.

4083. Do you think it would be adding a new responsibility to him?—It might be said that in an accident brought about by subsequent pressure or workings, he was to blame for not having properly examined it when it was within reach, whereas it might have arisen from causes beyond his control.

4084. And because of that, you would object to it?—Yes, if that inference were to be drawn.

4085. (*Mr. Jones.*) How do you explain rule No. 4: " He shall specify the width of the chambers or open- " ings in the slate vein, and the width of the pillars " between the chambers, and shall see that the proper " proportion of pillar is not lessened as the work pro- " gresses. Should any pillar show signs of giving " way or falling, or if any complaint is made to him, " or it otherwise comes to his knowledge that the roof " of any chamber or bargain is unsafe, he shall with- " draw the rockmen until the roof has been repaired " and made safe, or see that sufficient measures are " taken for their safety. He shall see that the roof of " each new chamber is left in a safe condition by the " miners before any slate is allowed to be worked " underneath?"—That the manager takes the responsibility of the place being worked efficiently and safely.

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4086. (*Mr. Evans.*) Do you consider that these rules come up to what Mr. Jenkins requires?—I think that they practically cover it. The managers take the responsibility of seeing that the roof is made safe before the miners leave it, and before any slate is worked underneath.

4087. And there is to be a daily inspection?—No, it does not state anything as to the daily inspection in that rule.

4088. (*Mr. Jones.*) But an efficient inspection?—Yes. Rule 2 requires him to visit each working place daily. "The manager, assistant manager, or foreman shall "daily visit and frequently examine every working "place and every travelling road leading thereto, and "shall ascertain the condition thereof so far as the "ventilation and accessible parts of the roof and sides "are concerned, with a view to their general safety."

4089. (*Mr. Jenkins.*) But that may mean simply going to the place and speaking to the men, and that is all. You would not require the agent to go to the rock and see the place, and examine it with the hammer minutely?—I do not think he is required to go and tap the whole of the workings daily.

4090. I did not suggest that, but only when they work the "thickness" home, when they cut the pillar, say, for a yard or two yards, to examine it, and see that it is done properly. Would you have any objection to appoint an officer to do that?—Of course, that is a legal construction of what this rule requires of the manager, and I prefer not to specify anything too closely. I think the responsibility for general safety should be thrown on the manager, and that he should see that all that work is done, and everything else that is necessary for the general safety of the men.

4091. Would you favour the appointment of a man to see that every side of a pillar is cut properly in every "thickness"?—Do you mean one man in each quarry, or in every chamber.

4092. One man in every quarry, or if that man could do some other work as well, let him do it, but that his chief work should be to see to that and keep a record?—I would sooner let the responsibility be on the manager than let him depute his responsibility to somebody else and take his report.

4093. But does he not depute it at present to his assistant managers?—Yes, but he takes the responsibility, and I think if it was left to one man and his report was accepted the responsibility would thereby be thrown from the manager himself and that it would not be as satisfactory as is the case at present under the special rule. The rule I have just quoted does not specify how it is to be done, but leaves it to the manager.

4094. Would you object to a periodical inspection of the whole of the quarry?—No.

4095. With ladders?—Do you mean the roofs?

4096. Yes?—I do not think it is commercially possible.

4097. That is to say, it would entail too great an expenditure?—Yes, and many quarries would have to be closed, I believe, if you did that. You must remember that to examine the roof of a bargain in that way is a work that occupies several days, and the expense of doing it throughout the quarry would be so heavy that it would mean the closing of the quarry.

4098. Would it be right to say that if a minute examination were made of the New Welsh Slate Quarry it would have to be closed—is it correct to say that?—I think that to throw money uselessly away would compel us to close the works.

4099. That is, you practically say that it cannot be made safe?—No, I do not say anything as to the safety. Where it is unsafe we do that, but to examine safe roofs simply for the purpose of inspecting them would make us close the quarry.

4100. Simply on the ground of the expense?—Yes.

4101. But not of the chambers being too unsafe?—Our expenses in repairing roofs are exceedingly heavy as they are, compared with other quarries.

4102. If it is said that the New Welsh Slate Quarry is too dangerous, and that if it were inspected minutely it would have to be stopped, is that a fair description of your quarry?—No. If you mean that if our roofs were inspected it would be found that we are at present working under unsafe roofs, and that as the result of that inspection we should be compelled to stop our quarry, it would not be true.

4103. It would not be true?—No, my reply is, we spend a good deal in keeping our roofs safe, and if we are made to examine roofs which are safe merely for the sake of examining them it would entail such extra cost that we should have to close the quarry. If we squander money which it is unnecessary to spend we should have to stop working.

4104. You have said that pillars have been cut at your quarry to a very narrow width?—Yes.

4105. Of late years?—Under the old company.

4106. You do not cut them now?—No. It is the duty of our surveyor to call my attention to it if he finds any of them being cut.

4107. If they were cut is it a source of danger?—Yes.

4108. And a weakness to the quarry?—Yes, certainly.

4109. Would you fix a maximum width to a chamber and a minimum width to a pillar?—No.

4110. You would not compel the owner to observe a certain width?—No, I would not.

4111. Do you know that it is done in leases, and that lessors generally make a provision of that kind in their leases?—No, I do not. It is not so to my knowledge. We do not work under a lease. We give a lease to Wrysgan, and I am quite certain that we have not specified in that lease anything as to a minimum width of pillar. At Wrysgan at the present time there is a chamber—I am speaking without actual knowledge, but my recollection is that it is upwards of 60 yards in width. I sent our surveyor there to see if it was worked safely, and he said it was.

4112. What is the thickness of the Wrysgan vein?—It is a narrow vein.

4113. At right angles to the top?—Yes.

4114. (*Mr. Jones.*) You mean that it is thin compared with your own?—Yes; thin compared with the Old vein.

4115. (*Mr. Jenkins.*) So you could work the chambers there much wider?—It depends upon the roof.

4116. In your time, how many accidents have there been?—There have been three fatal accidents; one was a fall of 4 feet. The man was working on a roof, and it was through his own carelessness, I should say.

4117. It was not within reach of the man?—No; proceedings were taken in respect of one of the accidents, and the case was tried at Penrhyndeudraeth. Mr. E. P. Jones will no doubt recollect it, as he was on the Bench. There was considerable doubt where the stone fell from, whether it came from the roof, or whether it rolled down from the floor above. I may state the circumstances under which this accident took place. The bargain-taker was away for the day, and a substitute was working for him, and we found afterwards that he had left a mass of about 10 tons improperly worked, which was loose, and which in all probability was the cause of the death of the two men. It was the bargain-taker's carelessness in working, so we believe, but of course we have no proof as to where the stone fell from, but we did find that the 10 tons were left loose.

4118. (*Chairman.*) Was it not the fault of the manager in not seeing that it was removed?—That may be a fair inference.

4119. (*Mr. Jenkins.*) If the provision I suggested just now had been enforced at that time would not those roofs have been made safe, and the accident prevented if it had been examined minutely by another man apart from the bargain-taker?—If that was the cause of the accident, and the manager had examined the place and found it out of course that cause would have been removed.

4120. You agree with that?—Yes, certainly,—if it had been removed, and was the cause of the accident.

4121. (*Chairman.*) How can you make sure that the roof is sound unless you examine it?—I do not see how you can; but of course a roof may change the day after it is examined.

4122. Do you think it would be commercially practicable to examine the roof and the pillars of each chamber once in every three months?—All the working chambers?

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4123. Yes?—I should like to calculate what that would cost. It would be very heavy, I am afraid, to examine them four times a year. It would mean four weeks' work in a chamber, at least.

4124. (*Mr. Evans.*) What would you say to six months,—after the changes of weather?—That would reduce the difficulty by one half.

4125. (*Mr. Jenkins.*) And what would you say to making it once a year?—That would reduce it to one-fourth.

4126. Do you say they have gone too high for you to examine them in that way?—I should think they have. When we have worked out a chamber, of course the height of a roof is very great if we have worked the vein right through.

4127. That you could not raise a ladder to see the top and examine it?—Of course it would vary in different quarries according to the dip. Where it is 22 degrees it would not be so high as ours with 34 degrees. I do not think you could make a hard and fast rule.

4128. I was asking you as to your own quarry. Could you not raise ladders to examine?—I could not answer that off-hand; but I think probably it would be so.

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4129. (*Chairman.*) You are the cooking instructress at the board schools in Festiniog?—Yes, at all the schools, except the Higher Grade.

4130. And you have evening classes, I believe?—Yes, I have one at Tanygrisiau.

4131. You have been certificated by the Liverpool School of Cookery?—Yes.

4132. We have had some evidence about the mode of life of the quarryman, and we want to learn how it can be improved by giving him better food, or better-cooked food. Perhaps you will tell us what you do in this district in the way of giving lessons in cookery?—At our cookery classes the children are taught to make all kinds of dishes at the lowest possible cost, and to make them nourishing, appetising, pleasant to taste, and to look nice. They are taught to cook meats in different ways—to roast, bake, boil, fry, and stew meat. Stewing is brought before the children as being the best way of cooking the most inferior and cheapest kinds of meat, in order to make them tender. They are also taught to roast a small piece of beef and make gravy, to boil a piece of mutton, to fry liver and bacon, to bake a piece of meat, to make stewed beef, haricot mutton, Brazilian stew, meat pies, sea pie, steamed meat pudding, and Irish stew. I think the people here need more nourishing food, and especially more meat. They only seem to get meat once a week; that is to say, on Sunday. That is the case with a great many, at any rate. They have a good dinner on the Sunday, and their food all through the week afterwards is tea and bread and butter. If soup were taken at the mid-day meal, or Irish stew, it would be far better than tea and bread and butter, and they could have a proper dinner in the evening after returning home. They are also taught to bake, boil, and fry fish, stuffed haddock, to boil a piece of cod and make sauce for it, to fry plaice (these are about the only kinds of fish we can get here), to make soups from vegetables, peas, and lentils, and from the stock in which the meat has been boiled, and also to make lentil soup, pea soup, potato soup, Scotch broth, and tomato soup. Generally speaking, the water in which meat has been boiled is thrown away by the people here instead of using it for soup. It would be very useful if soup kitchens could be established either in the schools or in the quarries, where a good bowl of soup could be got for about a halfpenny. The children have tea in their cans, which is made at home, and they take that at the dinner-hour, and just have bread and butter with it. They could have the soup in their cans, and bring bread to eat with it, and this would answer the same purpose and be far better for them. The same thing could be done at the quarries, and they might have a large plate of Irish stew for a penny.

The children are taught to cook all kinds of vegetables, and to make them tender and to keep their colour; to boil potatoes, cabbage, carrots, turnips, and onions, to warm up cold meat, how to keep it tender, and make gravy for it, because we consider a warm meal to be better than a cold one, to make shepherd's pie, minced meat, and meat cakes. They are also taught how to make bread, steamed and baked puddings, plain cake, and fruit pies. In the making of bread and cakes the coarsest flour is used, and the cakes are of the plainest kind, just to suit the people of the district. Steaming is brought before the class as the best way to make puddings light, and as being less wasteful than boiling, besides being a saving of time. We further teach them to make all kinds of milk puddings, treacle pudding, bread pudding, rice mould, stewed fruit, apple pies, London buns, rock cake, and sauces for puddings; also dishes suitable for an invalid, such as beef tea, arrowroot, cornflour, barley water, lemonade, oatmeal gruel, and fish. With regard to the dishes for invalids, we lay great stress on the way they are served up, that everything should be as clean as possible. They are further taught to lay and light a fire, to clean the cooking stove, to scrub tables and boards, wash dishes, clean knives, forks, and spoons, and to keep themselves as clean and tidy as possible over their work. The lessons are arranged in this way—a dish of soup, fish, or meat, a vegetable, a pudding, bread or cakes, and the invalid dishes are taken in lessons by themselves.

I think it would be a great improvement if we could have classes for nursing as well as for cooking. Of course they are taught in my classes how to prepare dishes for invalids, but then they have no idea of nursing, and there are no trained nurses in the district.

Baths, either in the houses or in a building where hot or cold baths could be had for a small sum, would be very useful. Most of the children, I am afraid, do not know what it is to have a proper bath, and of course their health cannot be good without that.

I believe that more time is needed for the classes. They are increasing in numbers each year. The time spent in each school is so short that the children forget part of what they learn. It would be a great improvement if a large room could be fitted up as a kitchen, when the girls could have more time for cooking, and be trained in all household duties. I may say that in the evening class we have a higher class of cookery, because the girls are so much older than those who attend the day school.

4133. (*Chairman.*) Are all the girls taught cookery in the day schools?—No, only those in the 4th, 5th, and 6th standards.

4134. What age would they be when they begin?—About 9 or 10 years of age.

4135. And how long do they go on with their cooking lessons?—They have them for about five weeks in the year.

4136. And how many hours per week?—Eight.

4137. (*Mr. Greaves.*) They have to complete a certain number of attendances?—Yes, 40 hours, and 20 hours at least of practice.

4138. (*Chairman.*) Is it your opinion that the quarrymen could have more nutritious food for the same money if his wife knew something more about cooking than at present?—Yes.

4139. Is any hygiene taught at the school?—No, there is not.

4140. You would suggest that at some of the large quarries there should be soup kitchens?—Yes, a large room, where somebody could make soup, would be a great improvement. You could get a large quantity of soup from very little, as far as the money is concerned. They could make it from bones and vegetables.

4141. (*Mr. Greaves.*) You are aware that cooking classes have been established here for some years?—Yes.

4142. Has it come within your knowledge that they have had any effect upon the homes of the quarrymen?—Yes, I have heard so. In some homes the children are allowed to cook, but in some they do not allow them. I have heard of three or four cases where the children do cook at home. They take their recipes home, and cook there for the family.

4143. And in your opinion it has already borne fruit?—Yes.

4144. And that it contributes towards the health and comfort of the quarrymen?—Yes.

Miss E. H. Russell.

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4145. How many girls generally would make the full number of attendances, and so earn the grant?—At Tanygrisiau there are, I think, from 32 to 36.

4146. And how many are there on the books there altogether?—About 42, I think.

4147. And out of those 42, 36 complete the full number of attendances?—Yes, and 36 I think will complete them in Festiniog this year out of 40.

4148. Instruction should also be given with regard to nursing, you think?—Yes.

4149. And the advantages of washing?—Yes.

4150. And a knowledge of hygiene?—Yes. If a room was fitted up as a kitchen it would be useful, and the girls could there be trained in ordinary household duties, such as laundry work and so on.

4151. (*Chairman.*) That does not exist at present?—No.

4152. You would advise that something more should be done?—Yes. The girls would then have more time.

4153. (*Mr. Greaves.*) Are the evening classes still conducted?—The attendance is dropping very much. We started with two classes of 18 in each class.

4154. When was that? — About the middle of November, and last week we had only about 20 girls.

4155. In the two classes?—Yes, 20 altogether, 10 in each class.

4156. Do the evening classes earn a grant?—Yes.

4157. But, as a matter of fact, very few girls complete the necessary number of lessons in the evening classes?—It has never been taken in the night school before; I do not think it could be taken before this year.

4158. (*Mr. Jones.*) Do you recommend that hygiene should be taught to the children that you have been talking of in the elementary schools?—Yes, I think it would be a great benefit.

4159. At what standard would you say it should be commenced?—Say about the Fourth Standard.

4160. Commencing at the fourth standard in the elementary stages?—Yes.

4161. And that it should be carried on to the Higher Grade School?—Yes.

4162. What about the standard of cooking; what is your chief object; do you prepare the children for the Higher Grade School or with the view to improving the home?—To improve the home.

4163. You arrive at that finally?—Yes.

4164. But your first object, I suppose, is to prepare them for the Higher Grade School?—My lessons will do that.

4165. So that you hand the children over to the Higher Grade School after having started them, as it were?—Yes, that is it. I try to lay a good foundation at first.

4166. (*Mr. Evans.*) Do the children of necessity go to the Higher Grade School?—No, they do not all go. Some of them leave school after finishing at the other schools.

4167. So that there must be another object in view besides to prepare them for the Higher Grade School?—Yes.

4168. (*Mr. Jones.*) Are the evening classes not prepared specially for those children who do not attend the Higher Grade School, to give them an opportunity of continuing their cooking lessons in the evening?—Yes, they can attend if they like to do so. I take a higher standard of cooking in the evening classes than the schools.

4169. (*Mr. Evans.*) Is that higher standard above the requirements of the working classes?—No.

4170. What makes it higher?—It is a little more trouble to make it. It is more than the younger children could take in hand.

4171. (*Chairman.*) Do you find that the girls take an interest in these classes?—Yes, they do, especially in the cleaning part of it; the laying and lighting of a fire, the cleaning of knives, forks, and spoons, and so on.

4172. (*Mr. Greaves.*) And it has a good effect upon their personal cleanliness?—Yes. I make them wash their hands and face if they need it.

Miss A. Wilson.

Miss Ann Wilson examined.

4173. (*Chairman.*) I believe you are the assistant mistress at the Girls' Higher Grade School?—Yes.

4174. And you hold a certificate from the Glasgow West End School of Cookery?—Yes.

4175. You take the girls who have been already under the instruction of Miss Russell?—Yes, they have all been with her.

4176. Will you tell us what you teach them?—We have day classes for cooking in the Higher Grade School for eight hours a week and evening classes for two hours a week. There are also evening classes at the Llan Festiniog school for two hours a week. The average number of pupils in attendance is as follows:—

I. *Demonstration.*

Day classes in Higher Grade School -	70
Evening " " " - -	34
Evening classes in Llan Festiniog - -	35

II. *Practice.*

Day classes at Higher Grade School -	24
Evening " " " - -	18
Evening classes in Llan Festiniog - -	18

These average attendances cannot be exceeded at one practice lesson.

The following dishes are taught at all the classes:—Various ways of cooking butcher's meat, cold meat cookery, bread-making, soups, cooking vegetables and puddings, sick-room cookery, cakes and pastry, beverages, and fish. I try to impress upon the children economy and cleanliness.

I should like to make a few suggestions:—

1. Ordinary cooking. (*a.*) That scholars coming from a distance should have dinner cooked for them in school at a cost of about 2*d.* each. I do not think a dinner can be made for less than 2*d.*, that is, a proper dinner, seeing that the number of children who would attend is comparatively small.

(*b.*) Some of the workmen only get a proper dinner on Sundays. The other six days they take tea in the quarry, and when they reach home in the evening they have tea again, with bread and jam or some tinned meat. Each day a proper dinner ought to be supplied to every workman, and some means should be taken to bring this about. A small kitchen might be erected at every quarry, and a woman paid to prepare soup for the men's dinner, at a cost of about 1*d.* each daily. The men should take bread with them to eat with the soup. If they do not take bread with them I do not think it can be supplied for 1*d.* The following receipts show how the dinners may be made for a little less than that paid by the men.

Pea soup could be made for 80 men at 1*d.* each= 6*s.* 8*d.*

	s.	*d.*
Peas, 21 lbs. at 2*d.* per lb. - -	3	6
Lentil flour, 1 lb. at 2*d.* per lb. - -	0	2
Carrots, 1 lb. at 1½*d.* per lb. - -	0	1½
Turnips, 1 bunch at 1½*d.* - -	0	1½
Onions, 7 lbs. at 2*d.* per lb. - -	1	2
Fresh bones - - - -	0	8
Salt, 1 lb. - - - -	0	1
Pepper - - - - -	0	1
Mint - - - - -	0	1
Water, 8 gallons - - -	—	
Total - -	6	0

Men pay 6*s.* 8*d.*, difference 8*d.*

Eighteen ounces of soup could thus be given to each man for 1*d.* each, but the difference of 8*d.* would not be enough to pay for the making, so that some assistance might be given by the quarry proprietors to pay for the cooking of the meal. I put the number at 80 just to suit the recipe I have drawn out, but of course it can easily be multiplied to suit any larger number of men.

Haricot beans and bacon could be made for 80 men at rather less than 1*d.* each, but I would make them pay 1*d.* Here is the recipe:—

	s.	*d.*
Beans, 14 lbs. at 2*d.* a lb.	2	4
Bacon, 5 lbs. at 6*d.* a lb.	2	6
Potatoes, 7 lbs. at 2 lbs. for 2½*d.*	0	9
Lentil flour, 1 lb. at 2*d.*	0	2
Salt, 10 ozs.	0	1
Pepper, ½ oz.	0	1
Water, 4 gallons	—	
Total	5	11

Men pay 6*s.* 8*d.*, difference 9*d.*

These receipts show what could be done, and the few extra pence might be expended in getting a little additional meat for some days.

(*c.*) Women should be taught the art of soup-making and cold meat cookery. As the Blaenau Festiniog water is deficient in minerals, vegetable soups might be used with advantage.

The use of tinned meats should be discouraged. Most people can roast or bake a leg of mutton or a joint of meat, but if it is not all eaten the first day, they do not know how to make it palatable for the next two or three days, if it should last. They just eat it cold and finish by throwing away the bones. I therefore advise the teaching of cold meat cookery and soup-making, in which latter the bones play an important part.

II. Nursing and sick-room cookery.

(*a.*) Trained nurses should be engaged, and should be always ready to go to the house of any workman to nurse the sick.

(*b.*) All the men ought to be able to attend ambulance classes, and be able to give "first aid" in case of accidents.

(*c.*) Women should be instructed in sick-room cookery, and the best way of serving food for the sick and convalescent. They should also be taught home-nursing.

(*d.*) Lessons or lectures for an hour a week might be given to women and girls on the treatment of simple diseases. I would not have them interfere with anything serious or dangerous, but merely attend to simple matters until the doctor comes in. A few examples of these are:—

1. Coughs and colds, give warm bath, and a hot drink of oatmeal gruel, or bran tea, or a pint of hot milk mixed with two table spoonfuls of treacle. Wrap up in a hot blanket, and get warm in bed.

2. Sore throat. If very slight, apply a bran poultice; if severe, and there is difficulty in swallowing, a mustard plaster, or mustard and linseed poultice should be applied, gargle the throat with sage tea and vinegar, place feet in mustard and water before going to bed, and take honey and vinegar mixed in equal quantities.

3. Sprains. Bathe joint four or five times a day in warm vinegar and water. Between the bathings, apply warm poultices, and rub frequently with camphorated oil for 15 minutes at a time. When the swelling falls, bathe in salt and water, and often place it under a cold water tap, and allow the water to run over it.

4. A bruise. Steep in warm water for 15 minutes, and apply hot bread poultices.

Remedies should also be taught for chilblains, whitlow, a gathering, fainting, a cut artery, burns and scalds, cramp, bleeding from nose, bleeding from from lungs, treatment of partially drowned, &c.

Miss A. Wilson.

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4177. (*Chairman.*) Do you find that there is a want of knowledge of hygiene among the quarrymen's wives?—I should think probably there might be; but I rather think they are too old to take lessons in that.

4178. But what about the young girls?—We take domestic economy as being the elements of hygiene. We take the first stage in Standard VI. and the second stage in Standard VII. Of course, they do not take domestic economy until they go to the Higher Grade School.

4179. So that practically some hygiene is being taught?—Yes.

4180. But under the style of "domestic economy"?—Yes.

4181. (*Mr. Greaves.*) About how many girls attend the Higher Grade School?—There are about 98 or 99 at present.

4182. And do all the girls take cooking lessons?—Yes.

4183. And also domestic economy?—Yes.

4184. (*Chairman.*) Do you think the teaching is bearing fruit?—Yes; I think so.

4185. How long has this teaching in domestic economy being going on in school?—About four years, I believe. It commenced before I came here.

4186. (*Mr. Jones.*) You do not happen to know how long cookery lessons have been given in this neighbourhood?—No; I cannot answer that. (Mr. G. J. Williams stated:—I think it is about 14 years.)

4187. (*Chairman.*) Do you think there is a want of bath accommodation here?—There are certainly none that I have ever heard of here; but I think the children—all that I know of—have a bath once a week. All the children that I know of have the tub on Saturday night.

4188. (*Mr. Jones.*) What about the evening classes,—what is your experience with them in the Higher Grade School—are they well attended?—Yes, they are; but they are better attended in Llan. The attendance keeps up very well at Festiniog.

4189. What is your attendance now at the Higher Grade School?—About 34 is the average.

4190. And what is the average age of those who attend?—It ranges from about 15 to 27.

4191. Have you any as old as 27?—Yes.

4192. How many are there, say, between 15 and 20 years of age?—Perhaps five-sixths of the whole number would be between those ages. There are not many there over 20.

4193. How many day scholars attend the evening class?—None, they are not allowed.

4194. Then really your evening classes are made up of girls who do not attend the Higher Grade School at all?—Yes.

4194. (*Mr. Evans.*) I suppose you would recommend these young ladies as good wives before any others?—Yes; I certainly should.

Mr. Henry Percy Maybury examined.

Mr. H. P. Maybury.

4196. (*Chairman.*) You are the surveyor of the Festiniog Local Board?—Yes.

4197. How long have you held that post?—For the last nine months, but I have been in the office for about a year and eight months.

4198. I believe you have some remarks to make to us?—Yes, I should like to make a statement as to the sanitary state of the quarrymen's houses and barracks in the district. The number of houses in the district of the Urban Sanitary Authority, exclusive of gentlemen's residences and farms, is as nearly as possible 2,380, and of these 265 are rated at more than 9*l.*, and consequently do not come under the definition of cottages, although a large proportion of them are owned and occupied by quarrymen. There are something like 2,110 houses of a rateable value of 9*l.* and under, and these are occupied almost entirely by quarrymen. In 520 cases at least the person owns the house he occupies. The majority of the houses are commodious and comparatively new, having been erected within the last 20 years, and, speaking generally, are of good design. Their positions, however, render them somewhat damp, as in one case you will find them built almost close to the rock, three or four feet only being the distance often from the back wall to the face of the rock, the latter rising in some cases several hundred feet above them—*vide* Church Street, &c. In another case they are constructed in terraces at various elevations, the back premises and offices being at higher levels than the floors of the living rooms—*vide* Tanrallt, Summer Hill, and Tanyclogwyn Terraces. Others again are built upon peat where the surrounding land is waterlogged. Sufficient care has not been exercised heretofore in the laying of concrete or asphalte damp courses, and in the provision of launders. These latter, if provided now, would minimise the defect to some extent. The houses are provided with water or pail closets, and in nearly every case slop drains are fixed with properly trapped gullies. The pails are removed every fortnight, and fresh ones properly disinfected substituted.

Mr. H. P. Maybury.

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During the last nine months only two complaints have been received that the scavenging had been imperfectly done, and upon investigation it was found that in both cases atisfactory explanations were forthcoming from the cavengers.

During the year ended 31st December 1893, the following sanitary work has been done in the district, viz:—

House drains repaired, cleared, and trapped -	149
„ „ ventilated - - -	71
Privies and water-closets repaired - -	88
„ „ supplied with water	102
„ new, provided - - - - -	10

The removal of ashes and other refuse is effected every 14 days, and no accumulations of a longer period exist.

Water of undoubted purity is supplied to nearly every house in the district, but there are a few cases where wells exist, and where the people prefer, from economical reasons, to get their supply.

These wells now form the subject of an examination by the Medical Officer of Health, and if the result of the analysis is unfavourable, steps will be taken to close them forthwith.

I believe certain photographs of houses have been submitted for the inspection of the Committee, and evidence given tending to show that the houses they represented were unfit for habitation in consequence of bad sanitary conditions. I have made a careful inspection of these houses, and find the facts to be as follows:—

1. Tanlan, Tanygrisiau. Five houses, one of which is not allowed to be occupied in consequence of a bad roof. Three of the remaining four are occupied, the average length of tenancy being 23 years. The living-rooms have a cubic space of 1,417 feet, and the bedrooms (2) of 1,072 feet. The average number of occupants per house is four. Slop drains and pail-closets are provided, which are in good condition. The houses are somewhat damp, but this is due more to the high-lying ground behind than to any structural defect.

2. Trellwyn, Tanygrisiau. Six houses. These are almost identical with the ones at Tanlan. The average length of tenancy is six years, the number of occupants per house averaging five, some of whom are children. The living-rooms have a cubical space of 1,760 feet, and the bedrooms 770 feet. Slop drains are provided back and front, and pail-closets, all of which are in good condition.

3. Llwynygell. Six houses of the same design as the others, but in somewhat better preservation. The average length of tenancy is nearly 19 years, the number of occupants average four. The living-rooms have an air-space of 1,312 cubic feet, and the bedrooms (2) of 1,900 cubic feet. Slop drains are provided, and pail-closets.

4. Dolgarregddu. 10 houses. These are in very good condition indeed, and compare very favourably with any in the district from a sanitary point of view. Slop drains are provided, all properly trapped, and good pail-closets for each. The houses are kept particularly clean by the tenants. The living-rooms have a space of 1,870 feet, and the bedrooms (2) of 1,160 feet. The average length of tenancy is 20 years, and the average number of occupants four.

It is a remarkable fact that the houses photographed have enjoyed an immunity from any disease, with the exception of one case of diphtheria at Tanlan, and three at Trellwyn, all of a mild type; the Llwynygell and Dolgarregddu houses escaping altogether.

To one unacquainted with the district, the photographs would be likely to convey a very erroneous impression, as they by no means represent the style of houses generally in the district. The total number of such would not exceed 100, and assuming that there are that number they would form hardly 5 per cent. of the whole.

Barrack accommodation. There are about 348 men living in barracks in the district. The various buildings are inspected periodically, and the sanitary inspector presents a quarterly report as to their condition to the Board. The whole are entered in the common lodging-house register, but certificates of approval have not been given in every case. When certifying for the number to be accommodated in each place, it was originally considered that 250 cubic feet per occupant was ample. My board have subsequently modified this to 300 feet per man, after making due allowances for the beds, and this will reduce the number by at least 25 per cent. This new regulation will be enforced rigidly. In no case will a room be approved which is used as a living and sleeping one until proper partitions are fixed.

The barracks are treated in precisely the same manner as common lodging-houses, with the exception that they are exempted from clause 21 of the byelaws, which prohibits the occupation of a bed by more than one person at one time. This clause is no doubt intended to apply to men of the casual type, who are continually moving from town to town, to prevent the spread of infection and filth. The quarryman occupying barracks is of a very different class, the men sleeping together being often of the same family, and working together as "mates" in the quarry. It may be interesting to state that out of the total number (348) only two have been notified as suffering from an infectious disease, viz., one of erysipelas and one of scarlet fever. The latter was an imported case from Beddgelert, the disease at the time being prevalent in the family of the man notified.

4199. (*Chairman.*) What kind of beds are they that the men sleep on in the barracks?—They are home-made bedsteads, with flock beds generally, but in one or two places the ticks are filled with straw.

4200. Then straw is used?—Yes, in one or two cases.

4201. Are the bedsteads fixtures, so that they cannot be moved?—Only in one case in the district, I think.

4202. Are they at Rhosydd Quarry, for instance?—Yes, there is one room at Rhosydd where there are bedsteads fixed, but notice has been given to the manager that he must remove them, and put proper partitions between the living and sleeping rooms.

4203. When was the matter taken up by the Local Board?—In August last.

4204. And did you find that the barracks required considerable improvements?—Yes, the Local Board have effected considerable improvements, but more are required.

4205. You permit two men to sleep in a bed?—Yes, we do.

4206. Would it not be better to prohibit that?—Yes and no. If you reduced the number from two to one the result would be that you would drive a large number of men into lodgings in the town, and you would invariably find that they would sleep two in a bed in these lodgings. The Board consider it better to have them lodging in the barracks in that way, so as to have them under supervision, rather than lose sight of them in the town. You will also find that it is the people with the largest families that usually take in lodgers.

4207. As a matter of fact you consider the present system the lesser of two evils?—Yes, that is so.

4208. What about some of the rooms which are directly under the roof, where there is nothing but the slate between the men and the sky?—We cannot, as a health authority, compel the owner to do anything in a case of that kind, so long as the roof is damp-proof, unless it were certified to be unfit for human habitation. I do not think the medical officer would interfere in a case of that kind.

4209. Do you think, at an elevation of 1,400 feet above sea level, that it is a fit place for a man to sleep in; I believe that is about the elevation at Rhosydd?—No, I do not think so, certainly.

4210. Do you not think that better accommodation should be provided?—Certainly, I think so, and in no case will a room be registered under the new modifications, unless it does comply with what we consider necessary for the accommodation of the men.

4211. (*Mr. Evans.*) Do the men who live in the barracks leave their refuse and so on lying about?—In all these cases they have a woman or two to look after them, and where that is so they are fairly clean, and compare very favourably with the houses.

4212. If you knew of any barracks of the character I have described you would object?—Certainly.

4213. (*Mr. Jenkins.*) How many men would you allow to sleep in one room in these barracks?—That would depend upon the size of the room. We consider that 300 cubic feet should be allowed for each occupant.

4214. (*Chairman.*) We have had a good deal of evidence about want of privy accommodation at the quarries; what is being done in that direction by the health authority?—Nothing has been done, nor has any move been made by us to take any steps in the matter.

4215. But would not the health authority of themselves take steps if they thought it necessary?—I hardly know. I am somewhat diffident about answering that question, because you as inspector of mines would naturally draw our attention to it if you thought we were remiss in the matter in any way.

4216. What can be done; are privies or pails supplied to any of the quarries now?—No, not at the quarries.

4217. (*Mr. Greaves.*) There is usually a good flush in the privies at the quarries?—Yes.

4218. (*Chairman.*) Are the privies in the quarries looked after in any way by the health authority?—No, unless they are connected with any house at the quarries.

4219. Not those connected with the mills?—No.

4220. Are they under the health authority?—I should say "Yes," inasmuch as they are in our district.

4221. (*Mr. Evans.*) But you do not consider it your duty to look after them until your attention is called to them by the inspector of mines?—Well, I have never had my attention directed to anything other than domestic refuse, or the provision of privies for houses in the district. I have not been called upon by anyone to look after any privies connected with the quarry proper or the mills, but if a wish were expressed to that effect I have no doubt I should receive instructions very soon to see to it.

4222. (*Mr. Jenkins.*) May I ask, what is your position under the Local Board here?—I am surveyor and manager.

4223. You are not the sanitary inspector?—No.

4224. (*Chairman.*) But you have a sanitary inspector under you?—Yes.

4225. (*Mr. Jenkins.*) You are in a position to look after him?—Yes. He has nothing else to do but to attend to matters of that kind.

4226. Do you hold any certificate under any sanitary authority?—No, I do not.

4227. Do you consider it your duty or that of the inspector under you, to inspect the quarries also, I mean the sanitary condition of the quarries?—No, seeing that no one actually lives there, we do not consider it necessary to inspect them from an occupation point of view, but where we find barracks we think it necessary to examine them, and have such alterations made as we consider advisable.

4228. As to the houses you have referred to, you consider them habitable houses?—Yes, I do.

4229. How many rooms are there in the houses at Trellwyn?—Two bedrooms and a living room.

4230. There is a living room in all?—Yes.

4231. What is the size of them?—11 feet to the purlin—that is half way up.

4232. (*Mr. Greaves.*) In your opinion, all those houses are in a good state?—Yes, and no medical officer would condemn them.

4233. (*Chairman.*) Have any of them been condemned?—No.

4234. Has the medical officer examined them all?—No.

4235. (*Mr. Jenkins.*) What is the average number of occupants?—Four.

4236. How many houses are there?—Six.

4237. What is the largest number of occupants in one house?—Eight, I think. Three of the eight are little children, two of them being only a fortnight old. There are six children and the man and wife, and one of the six children is a small baby, about 18 months old.

Mr. H P. Maybury.

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4238. (*Mr. Evans.*) Have you anything at all against these houses?—No, nothing whatever. I met Mr. Holland on the ground during last year, and asked him to have some ventilation effected there, and he had it done at once.

4239. (*Mr. Jenkins.*) They are all waterproof, are they?—Yes. I have not found a single case where damp goes through the roof.

4240. (*Mr. Evans.*) You find plenty of houses in the country less roomy than these?—Yes.

4241. (*Mr. Jenkins.*) Are the rooms on the same floor?—There is the living room and one bedroom on the ground floor, and one bedroom over the living room.

4242. A sort of loft?—Yes.

4243. (*Mr. Greaves.*) Is that class of houses appreciated among the workmen?—Yes; very much so. I asked one man how long he had lived in a particular house, and he said "six years." I asked him whether he had been pretty well during that period, and he said he had enjoyed very good health, and that he had removed from another part of the town because he had been poorly there.

4244. And that is one of the houses referred to as being unfit for habitation?—Yes.

4245. (*Chairman.*) What about diphtheria in those houses?—There are more cases of diphtheria notified from the houses which were described as "model" dwelling-houses than from the houses which were spoken of as being unfit for human habitation.

4246. Is there a place for washing at the barracks?—In one case, the old manager's house, there is not. I have written to Mr. Robert Roberts about it, and he proposes to erect a shed for the purpose.

4247. Is there a place for washing at Rhosydd?—No, they wash at the stream.

4248. (*Mr. Evans.*) Does any woman attend to the barracks at Rhosydd?—I do not know, I am sure.

4249. The evidence we had was that no woman attended to the place?—I do not know, but they do in the town.

4250. (*Mr. Jenkins.*) Do the barracks at Rhosydd belong to the quarry owners?—Yes.

4251. (*Mr. Jones.*) I believe you have some factories and mills in the town under your supervision?—Yes, I have.

4252. And do you attend to the sanitary condition of those places?—Yes.

4253. What difference do you make, say, between a slate mill in the town and a slate mill in the quarry?—I do not know that there would be any practical difference between the slate mills. I would not take very much notice of a factory, because it comes under the Factory Acts.

4254. But you have some slate mills in the town under your charge?—Yes.

4255. And you look after these places very carefully, but you do not look after similar places at the quarries; why is that?—I do not know that we make any exception.

4256. But the fact is that you look after the one and do not look after the other?—I look after the mills in the town because they are in the immediate neighbourhood, with houses round about them, whereas those at the quarries are isolated and away from the houses.

SEVENTH DAY.

At Corris, 3rd April 1894.

PRESENT:

DR. C. LE NEVE FOSTER IN THE CHAIR.

MR. J. J. EVANS, F.G.S. | MR. JOHN JENKINS.

Mr. M. Roberts.

3 April 1894.

Mr. MEYRICK ROBERTS examined by the Chairman.

4257. You are the manager of the Bryneglwys Quarry?—Yes.

4258. How long have you been manager?—You may say 14 years. I was there as an assistant for 4 or 5 years before that, and I have been there for 18 years altogether.

4259. And how long before that were you engaged in slate mining?—I have been engaged in it ever since I was 11 years of age, and I am now 50.

4260. Therefore you have had 39 years experience in underground slate quarries?—Yes.

4261. I believe you have something to tell us about your quarries?—Yes, I have written a short statement. (*The following statement was then read.*) Our quarry is on three different estates. The first we call Bryneglwys, the second Cantrybedd, and the third Hendrewallog. On Bryneglwys we have 15 chambers, but we only work 9 of them at present. Our ordinary chamber is 30 yards along the vein, and the width up to the upper "hard" is from 17 to 18 yards. An ordinary pillar is supposed to be 10 yards. On Cantrybedd we have 11 chambers, but numbers 1, 3, and 9 are not being worked. The chambers and pillars are the same in length and width as those mentioned above. We have one level 30 yards below the working level, so we have to haul up with water-wheels along an incline lying on the face of the rock. All our working tunnels are about 6 yards outside the workable slate vein. Most of the men live down in the village, about a mile-and-a-half distant. Nearly all the village belongs to the company. The rents of the houses occupied by the men range from 2*l.* 10*s.* to 7*l.* per annum. There are small gardens attached to the houses, with the exception of one or two. All the land around the village belongs to the company, and has been divided between the men, so that they have each enough land to keep a cow or two. One field has also been divided into small plots of from 100 to 400 yards for use as gardens at a rent of one farthing per square yard. We have a railway to the back of most of the houses along which the men can bring their coal, flour, &c. At the quarry we have two barracks for the men who live at a distance to lodge in during the week. A garden, in which the men can grow vegetables, is attached to each of the barracks. These gardens are let free, and we only charge 1*s.* a month as rent for the barracks. A cheap train is provided for the men to come to work on Monday morning, and to return on Friday night, half the ordinary fare being charged. For the last three or four years the men have only worked five days per week, and I believe that both master and men are well satisfied with this arrangement. The men work extra hard during the five days, and they are very well paid. Our wages per week are equal to those paid at any quarry where the men work six days, and our men get one day per week to attend to their own gardens and farms. The journeyman is paid at a higher rate of wages by the contractors, and those who work by the day for the company have received an advance of 4*d.* or 5*d.* per day to make up for the Saturday. I think I can assure the Committee that no better feelings exist between master and men than those which exist between Mr. McConnel and his workmen.

4262. Have you anything to add to your statement?—No, I do not think I have; but I think it would be well if Mr. Williams ran roughly over the statement in Welsh, in order that the men may have an opportunity of contradicting it, or any portion of it, if they wish.

4263. Then some of your men are present?—Yes, two of them are here now. (*Mr. G. J. Williams here read out the witness's statement in Welsh.*)

4264. Is Mr. McConnel the owner of the quarry?—Yes, the sole owner—Mr. W. McConnel. Mr. W. H. McConnel is the son.

4265. With regard to the five days a week which your men work—how many hours a day did they work formerly?—They start at 7 in the morning, and they work until 12. They then have half an hour for dinner, and they leave off at 5.30.

4266. And what did they work on Saturdays?—We do not work on Saturdays now.

4267. Are the hours you have just given us the hours you work now?—Yes, 7 to 12, and 12.30 to 5.30.

4268. That makes 10 hours a day?—Yes.

4269. And 50 hours a week?—Yes.

4270. How many hours did the men work formerly, when you worked six days?—An extra five hours, that is, from 7 to 12 on Saturday.

4271. Therefore they now work 50 hours a week of five days, and formerly they worked 55 hours a week of six days?—Yes, that is so.

4272. Do I understand you correctly that your books show that they get just as good wages now as they did formerly, although they work a day less?—I think so. I think I can prove it. I have brought the wages book with me, and I have no objection for the Chairman to look over it. (*The witness here handed in the book referred to.*)

4273. I suppose you have no objection to my showing it to the members of the Committee?—No, not at all, but I wish it to be kept private. I saw in the paper that the Llanberis men received wages in 1892 on an average at the rate of 31*s.* per week, working six days a week, but our men received at the rate of 33*s.* 2½*d.* per week working five days a week. Our men, therefore, received 2*s* 2½*d.* a week more for working five days than the Llanberis quarrymen received for working six days.

4274. Was that in 1893 or 1892?—In 1892 I think, but I am not certain.

4275. You know Festiniog well,—have you any suggestions to make to us for improving the condition of the men here or at Festiniog or anywhere else in the county?—No, I have nothing on my mind just now.

4276. (*Mr. Evans.*) I should like the history of your men; are they all quarrymen from boyhood?—Of course the slate makers are, they cannot be anything else than that. The men who work outside came first of all from Llanllyfni with Mr. Williams when he came here. That is a long time ago.

4277. What about the rockmen, are they quarrymen from boyhood?—No, they are not.

4278. Are there any of them rockmen from boyhood?—I cannot tell. Perhaps there are, but I do not know.

4279. But most of them are taken from the labourers?—Yes, some of them commence as labourers, and then we put them on as miners, and then on to the rock. That is our rule. First of all they are labourers, then miners, and afterwards rockmen.

4280. So you have no means of comparing whether a rockman who has been a quarryman is a better rockman than a labourer who has become a rockman?—Of course a quarryman ought to make a better rockman, because he understands the nature of the rock.

4281. Do you know of any accidents, or have you seen any that have happened in consequence of having an unpractical man working on the rock?—No.

4282. You do not know of any?—No. I think Dr. Foster will be able to tell you that we have been very fortunate in that respect.

4283. I see according to the returns that you had four fatal accidents from 1885 to 1893. Can you tell us what was the cause of those accidents?—The last accident we had was that of a man who fell down through a shaft. That was in 1894.

4284. You can refer to that if you like, but I was referring to the period between 1885 and 1893?—I do not quite remember. I know that one man was killed at No. 8. The "cover" came down on his head. If you can give me the names of the men, perhaps I can remember the cases.

4285. (*Chairman.*) David Evans and Hugh Jones are two of them?—A piece of rock came down on David Evans and killed him.

4286. That was in 1877?—Yes.

4287. (*Mr. Evans.*) From what kind of a place did the rock fall?—From the face of the bargain.

4288. Was it from his own bargain?—Yes. There was a slant running up, and the thick end upwards. I think I am now referring to another case. Those men were miners working at No. 14. They were working at night, and a piece came from above and killed them.

4289. From where did the piece come?—From the face of the rock.

4290. Was it from their own bargain?—No. They were miners preparing the opening.

4291. Were those men in charge of the rock from which this piece fell?—Yes.

4292. Then it could not be anybody else's fault that it came down?—I do not think that you can blame anybody. The bargain-man never thought it would come down, but it did come.

4293. There are two other accidents. One of the men was John Lewis. Do you remember how that happened?—He was a miner again. He was making an opening in No. 6. He was boring a hole in the face of the rock, and the piece into which he was boring the hole fell upon him.

4294. (*Chairman.*) The other case was that of David Roberts, a lump from the "cover" fell on his head?—Yes.

4295. (*Mr. Evans.*) Therefore all your accidents were caused by falls from the face of the rock?—Yes.

4296. Can you suggest any means of preventing that sort of thing?—No, I cannot, because although you may make the "cover" as safe as you possibly can today something will get loose in time.

4297. You have said that you pay very good wages as high as when you work six days. Do you get the same amount of work as well?—I think we do, or very nearly. We are very well satisfied.

4298. Your experience is that you get as much work out of the men in five days as you formerly got in six?—Yes. I have very great faith in short time and hard work.

4299. (*Mr. Jenkins.*) With regard to the accident to the two men—were they found dead in the morning, were they working at night?—Yes.

4300. Were they in charge of the rock that fell on them?—No.

4301. They were not on that very rock?—No, they had nothing to do with the piece that fell.

4302. Therefore it could not have been their fault?—No, except in this way, they did not inspect the place above them before they began to work. They ought to have done that.

4303. How high was it?—From 2 to 5 yards, I think, or about that.

4304. Do you inspect these places often. How often do you make an inspection of these places?—What places?

4305. The places you have left?—We do not inspect them, but the men inspect for themselves, and if they think there is anything dangerous we go there at once. They must tell us about it first.

4306. But you do not go yourself?—No; we have no regular system of inspection.

4307. Where a place goes out of the men's reach you do not inspect those places?—No.

4308. Unless you suspect it as being dangerous?—Yes, that is it.

4309. Do you not think it would be better to inspect it periodically—do you think it would tend to decrease the number of accidents?—I do not know.

4310. The place is open to a great height when you leave it?—Yes, in some places it is so, but we do not go very deep without cutting a new "cover."

4311. Do you leave that as a barrier above the men who are working underneath?—Yes, to protect them from anything above them.

4312. And that serves to protect them?—Yes, of course.

4313. What is the width of your vein?—In the middle of the vein it is about 16 or 17 yards, but at the end it is a little wider. I gave it as 17 to 18 yards in the statement I made at the commencement. That is about the average.

4314. What is your opinion of the system of filling the place up—could it be applied to your quarry?—In what way do you mean?

4315. I mean the filling of the place up after it has been worked?—I do not know what you can get to fill. You must carry out everything where you are working, and there will be nothing to fill it up with.

4316. In some mines they fill the place up after they have worked it?—But we go down and we must keep the place clear.

4317. You think it is quite impracticable to fill it up?—Yes; our vein is perpendicular.

4318. There is one quarry in North Wales where they fill up as they work a chamber?—There may be. I do not know. Of course they must work one chamber first and carry rubbish from the next to it.

4319. You are of opinion that it is impracticable to carry out that system here?—Yes, certainly.

4320. You have referred to allotments. What do you say the men pay for their gardens?—They pay at the rate of a farthing per square yard.

4321. Is that added to the rent of their houses?—Yes, if the garden is not attached to the cottage. If they go to the field it is added.

4322. Therefore, it is not included in the rents which you say range from 2*l.* 10*s.* to 7*l.*?—No.

4323. What do those rents include?—The houses only.

4324. And the difference between the 2*l.* 10*s.* and the 7*l.* represents a difference in the size of the houses?—Yes.

4325. Are the houses freehold or leasehold?—The whole of the property is freehold, and belongs to the company.

4326. You say that the men who work by the day get more wages on account of their working only five days instead of six?—Yes.

4327. What are their wages?—The dressers outside get 4*s.* a day, more or less—1*d.* or 2*d.* under or over, and I think they get just about the same inside.

4328. What do you pay the labourers who work by the day?—We do not employ them to work by the day; they are on piece-work. There are, however, a few at from 3*s.* 4*d.* to 3*s.* 6*d.* or 3*s.* 8*d.*

4329. Those men do not work for the contractors?—I am referring now to the men who work for the company. Those who work for contractors get from 3*s.* 8*d.* to 4*s.*

4330. What were the wages before you began the five-days' system?—3*s.* or 3*s.* 2*d.*, according to the work. We classify them. They are not all paid at the same rate.

4331. And the men are now paid at a higher rate in proportion?—Yes; they were raised purposely about four or six months ago, that is to say, they were raised because they were only working five days a week.

4332. Did not the advance in wages take place on account of the improvement in trade?—No, it was not so. Of course you might put the two together if you wish.

4333. But they are two distinct causes, are they not?—Yes, of coures.

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4334. The men only work five hours a week less now than they used to do?—Yes.

4335. Are the wages higher in proportion, taking the men who work by the day only?—Our men get quite as good wages now as they did when they were working six days a week, and better.

4336. They earn better wages all round?—Yes.

4337. And you say they are quite satisfied with the arrangement?—Yes, I believe so.

4338. Are both classes of workmen satisfied—the journeymen as well as those who are paid by piece-work?—They can testify for themselves. Some of them are here now.

4339. (*Mr. Evans.*) Do you expect every man to take care of his own bargain and to see that it is worked safely?—Yes, I do.

4340. So that you do not consider that you have any business to interfere?—No. We always consider that he is to call our attention to anything he has any doubt about.

4341. I suppose you expect him to do it right if it is within his contract?—If he says there is anything wrong, of course we will go there at once with long ladders, and send proper men to help. We have practical men to send with the long ladders to those places.

4342. You have never had any accidents from blasting, or from the use of explosives in any way?—No, I do not think we have. I do not remember one at this moment.

4343. Can you tell us what is the proportion of your non-fatal accidents to your fatal accidents?—No, I cannot say.

4344. You have no idea what their number is?—No, I have never thought of that. They are very few, I think.

4345. Do you think they are equal to the fatal accidents in number?—I have had to report on a few during the last five years, I think; but only a very few. I never thought of making any calculation on that point.

4346. (*Mr. Jenkins.*) Most of the accidents have occurred from falls from the top?—Yes, from falls of ground.

4347. Do you believe it is safe to leave these places entirely to the men themselves?—I think they are the best authority, because they know all about it.

4348. Do you think that the manager has any responsibility on that head; ought he to look after the men and see that they work the place properly and safely?—I cannot see how the manager can, unless the men call his attention to it, because it takes him all day to inspect two or three chambers, and of course the men who work in the place know better than anybody else.

4349. Do you know that the manager is held responsible for the safety of the place?—Yes, to a certain extent.

4350. Do you think the manager can shift the responsibility from his own shoulder to the shoulders of the men?—I do not know what you mean.

4351. By leaving the place entirely to the control of the men, by leaving the men to themselves?—Of course the manager has his duties, and the men have their own duties. They are sensible men, and they help one another as much as possible.

4352. But the manager is supposed to look after the men, and to see that they work the place properly and safely?—Yes. Of course, the men are to call his attention if there is anything that they suspect to be wrong. It is impossible for any manager to know of these things when he just passes round.

4353. I see by the wages book that you have three separate classes of men. Have you a separate standard wage for the three classes?—No, they are pretty much the same. We value the men as we find them.

4354. (*Mr. Evans.*) Are there any men in your locality who suffer for the want of anything in consequence of being paid wages that are too low—I mean ordinary men, who are anxious to work?—Of course, we are not Wesleyans. We must pay a man according to his ability, without taking into account his family.

4355. But is there any need among the men for necessaries?—I cannot point to anyone now.

4356. (*Chairman.*) With regard to the accident in 1877 to David Evans and Hugh Jones, you say it was a fall over which the men themselves had really no control?—They were working in the opening, and the bargain-men were working just above them. It seems that the bargain-men blasted the hole and took the loose rock down—everything that they thought was dangerous, but during the night some of the rock fell on these two men.

4357. So that it was some rock that was being excavated by other men that was left in a dangerous condition?—Yes.

4358. And it fell upon these two men?—Yes, but they had to pass this loose piece when they were going to their work, and they ought to have seen it. They ought to have seen that the place was safe before they went to work.

Mr. H. Roberts.

Mr. HUGH ROBERTS examined by the Chairman.

4359. Where do you live?—At Abergynolwyn.

4360. And what are you?—A rockman.

4361. At what quarry do you work?—At Bryneglwys.

4362. Do you work underground there?—Yes.

4363. How long have you worked there?—From 30 to 40 years.

4364. And you have worked underground there the whole of that time?—Yes.

4365. What suggestions have you to make to us for ensuring the health and safety of the workmen?—The best thing I can suggest is that plenty of care should be taken of every place.

4366. Have you anything else?—I do not think I have any suggestion to make in that direction. I may say that as far as my experience goes two out of every three if not three out of every four, accidents that occur take place owing to the negligence of the men themselves, or to their carelessness or want of thought. That is due to their over-anxiety to make good wages.

4367. Were you at the quarry when David Evans and Hugh Jones were killed in 1877?—Yes.

4368. Do you think that they were in any way to blame for that accident?—Yes, no doubt they were. They ought to have taken more care. They worked in the chamber, and if they had taken proper care the accident would not have happened.

4369. In the case of David Evans, who was killed in 1890, do you think he was in any way to blame for the accident which resulted in his death?—Yes, I think he was, without a doubt. He and his partner, or the contractor, were to blame. The place was dangerous, but with care the accident might have been avoided. If they had examined the place properly, they might have detected the danger. I know the place well, because I went there to work in succession to the man who was killed. I should like to say another word, but I do not do it with the view to flattering the manager, my fellow-workman will be able to confirm what I say. The assistant manager had warned both the men in the morning. They were told not to bore the hole where they were boring it, and they were told that the rock would certainly slip down if they did so, but they did not take the advice given to them. They did as they thought best themselves, and the accident was the result.

4370. (*Mr. Evans.*) Can you suggest anything to prevent these accidents, except more care?—No, I cannot, but I consider that the manager should exercise more care as well as the workman.

4371. Do you consider that it is the duty of the rockman, or the workman, whatever he is, to take care of his own bargain independently of the manager?—Yes, I do, because the life of the workman is in the question and it follows that he ought to take every possible care.

4372. I suppose there are many things that happen that the workman only can find out, and that it is impossible for anybody else to find it out?—Yes, that is the fact, undoubtedly. The man who works in the place ought to know better than anybody else what the

danger is. The manager ought to see to these things, but the workman ought to inform the manager if he knows of anything dangerous. I have never seen a manager who would not attend to such matters, and remove the danger if their attention were called to it.

4373. Do you think that the manager should allow men to work in a dangerous place, when the place is found to be dangerous?—No, he should not, of course, but it is possible that the manager relies on the knowledge and experience of the contractor. I do not know how far the responsibility ought to rest with the manager. The workman may think that the place will be safe for a time. If he considers that the place is unsafe, he must be a very foolish man if he goes there, seeing that his life is in danger.

4374. You seem to be referring to a place now with regard to the safety of which the manager and workman are of a different opinion?—I have not seen a place of that kind. I have never seen a place where a manager compelled a man to go to work, but I have seen cases where the manager and workman differed in opinion, one thinking it more dangerous than the other.

4375. But you have not seen any manager pressing the men to go to work to a dangerous place?—No. The only remedy we can get, as far as I am aware, is that there should be a complete understanding and proper sympathy between the manager and the workmen.

4376. Do you think there can be any improvement in that respect?—No, in my own case there cannot. I do not think there can be any improvement in our quarry, but I believe I have seen some who only have given a very unwilling ear to our complaints. I think, however, that matters are improving in that direction.

4377. Do you think that anything can be done to diminish accidents if any change were brought about in the inspection of quarries?—I do not think the accidents would be any less, but the men at our quarry are strongly of opinion that the Inspector should be a practical quarryman, and that he should visit the quarries oftener than the present Inspector is able to do. Our opinion is that we do not want an Inspector to visit the quarry so much after an accident has happened, but before that, in order that he may prevent the occurrence of accidents if possible.

4378. How often do you think that this Inspector should visit your quarry?—I cannot decide that point, but I believe he ought to visit it four or five, or perhaps six times a year. But that is a question I have not considered very carefully.

4379. I understand from Mr. Roberts, your manager, that you now work five days a week only?—Yes.

4380. Do you work harder now than you did when you worked six days a week?—Yes, of course we do. We work as hard as we can.

4381. I suppose you will not admit that you were not working hard when you worked six days?—I believe myself that we would work as much in eight hours as in twelve. I am a strong believer in the eight hours movement.

4382. You believe you are giving as much work now in five days as you did formerly in six days?—Yes, and more under some circumstances. There is no doubt about it. We use every effort to get through as much work as possible, now that we have only five days a week to work in, but when we had the Saturday to fall back upon we did not exert ourselves so much.

4383. You are not paid more now for the quantity of work you do than you were paid before for the same quantity?—If the amount of work is equal, the pay comes to much the same thing.

4384. But is the work equal?—Yes, I believe it is. We also pay more to the men who work by the day, in consideration of the fact that they only work for five days instead of six.

4385. Therefore you do not think that the owner suffers in consequence of the men being allowed to work for five days instead of six?—No, the owner is not a loser. For one thing, he paid a full day's wage formerly for the Saturday, when we only worked five hours on that day.

4386. (*Chairman.*) Do you think you would be better off with six days a week, of eight hours each, than under the present system of five days a week, of ten hours each?—I do not think we would be. I believe we would be pretty much in the same place.

4387. (*Mr. Evans.*) In speaking of an eight hours' day, do you mean eight hours for six days or eight hours for five days?—I have no authority to speak on behalf of my fellow-workmen on this point. I am only expressing my own opinion as to the eight hours question.

4388. Then what is your own opinion. Do you mean eight hours a day for six days, or eight hours a day for five days?—Eight hours for six days, of course.

4389. You see it is important we should know that, so that we may not be led astray?—I should like to say that the eight hours' question deals with two classes of workmen in these slate quarries. Eight hours a day is quite long enough for a man to work underground in a damp place and in a smoky atmosphere; but with regard to the men who work outside, perhaps they can work for ten hours. At the present time we dare not go home after we have worked our eight hours, as we have to help the men who work outside with their work.

4390. Can you tell us which of those two classes of workmen are the healthier, the men who work underground, or those who work outside?—Yes, I can tell you that at once. The men who work outside, of course.

4391. Would you be surprised to hear that the reverse is the case in the Festiniog district?—I do not know anything about that, but they drink too much tea in Festiniog.

4392. Do you drink much tea here?—No, we try to get milk here. You heard what Mr. Meyrick Roberts said about cows.

4393. Do you, as a class of workmen, drink much milk?—We do, as much as we can get, but that is much too little. I should like to say that the plan we have in connexion with our quarries is of the greatest advantage to the men, and I should like to see it prevail elsewhere.

4394. You are now referring to the letting of land and allotments?—Yes, so that every man might have sufficient land to keep a cow or two. As to the gardens, the value of the land has been increased to the owner from 4*l.* to 9*l.* or 10*l.*, but to us it is equal to 80*l.* or 100*l.*

4395. You find it is a great benefit to you as a body of men to have small holdings of that kind?—Yes. I think it would be one of the greatest advantages the working population could have, if it were possible to get them, and to have them compact and convenient, so that they might be cultivated by the men in their spare hours.

4396. I do not know whether I should ask you, but have you any very old men amongst you?—I think I am the oldest.

4397. To what age do you work generally at Bryneglwys?—I do not know. I have buried every one of the workmen who were my seniors.

4398. How old are you?—I am a widower, and am not going to tell you my age. I am 63.

4399. And you are the oldest workman at Bryneglwys?—Yes, I am the oldest who is working there now; and I have also worked there for a greater number of years than any other man.

4400. What about your dwellings—have you good houses?—Yes, they are excellent houses, or they seem so to me, compared with the huts in which men lived in my early days.

4401. (*Mr. Jenkins.*) You consider that the improvement you have had in the matter of houses and gardens is a special advantage to you as workmen?—Yes.

4402. And that is the general opinion among the men?—Yes, it is.

4403. How much rent do you pay for the house alone?—The rent varies. There are a few old houses which the company bought along with the property. The rents vary, I think, from about 3*l.* to 7*l.*; 5*l.* as a rule is the rent.

4404. What do you pay per acre for the land you use for the purpose of keeping cows?—That has been valued as fairly as possible by calling experienced men there to value it. Some land may be much better than others, and every man does not pay at the same rate.

4405. And the workmen are satisfied with that arrangement?—Yes, and we would be very glad to get 40 or 50 acres more added to it if we could.

Mr. H. Roberts.

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4406. Do you think that advantages of the same kind ought to be extended to workmen throughout the country?—Yes, that is our opinion. It ought to be one of the first privileges extended to every quarrying district.

4407. What is the opinion of the men with regard to working five days a week instead of six?—We have not taken the matter into consideration lately, but we put it to the vote on one occasion and the majority at that time were in favour of working five days. If we were to take a vote now, I cannot say but that they would call for a week of six days. I cannot say how they would vote.

4408. Does a different feeling prevail among one class of workmen compared with the other class?—Not so much now, but there was at one time. The men who work by the day felt at one time that they were losers by the arrangement, but now the contractors as well as the owner pay the journeymen at a higher rate of wages. There are only a few journeymen paid by the owner; they chiefly work for the contractors. I do not think there is any ill-feeling between the two classes of men at present.

4409. Can you tell us what proportion of the men work by the day at your quarry—I mean those who work by the day for the owner and contractors?—I can scarcely answer that off-hand, but I should think one man out of every three is a journeyman.

4410. And those men have five days per week counted to them instead of six?—Yes.

4411. Has there been an advance in the rate of wages to every one of those men to compensate them for the loss of the one day per week?—Yes.

4412. What was that advance?—The advance varies, of course. I cannot say how much Mr. Meyrick Roberts advanced to the journeymen who work for the company, but I can say what we pay.

4413. And what do you pay?—We advanced the wages from 3*s*. 8*d*. to 4*s*.

4414. And those wages are reckoned for the five days, I suppose?—Yes.

4415. Do you feel that that is an advantage?—We do not consider it a disadvantage. It does not matter much which system is carried out.

4416. Do you not know that there is a feeling among the journeymen against the five days?—That has been the case to a very great extent, but that feeling was based on the assumption that they would receive 4*s*. per day if they worked for six days. They are wrong there, for if they were to work six days a week they would only be paid at the rate of 3*s*. 8*d*., the same as formerly.

4417. The accidents that occur at your quarry happen mainly owing to falls of ground?—Yes, they happen principally from falls when men are working. There have been 29 or 30 during the period I have been working there, but I do not know of one that has happened from a fall of ground without notice, so to speak.

4418. Those are accidents from the ground which is under the immediate charge of the workmen at the time?—Yes.

4419. Take the accident to David Evans and Hugh Jones, was that rock under their direct charge?—All the opening was under their direct charge, and they ought to have observed it.

4420. Do many of these falls occur which do not result in accidents?—Yes.

4421. And is there any record kept of those falls anywhere?—I do not know. We have no great falls, such as there are at Festiniog.

4422. But there is no record kept of these falls?—I cannot answer that question. We do not keep any record, but we recollect them very well, especially if we have had a narrow escape.

4423. There are more of these, I suppose, than there are of falls which result in accidents?—As far as my memory goes no accident has taken place from an unexpected fall. The falls take place in the places where the men are actually working. There has been no unexpected fall, as far as I know.

4424. But there have been many unexpected falls which did not result in accidents?—Yes, falls have happened, but they have been most frequently in the night.

4425. Where do they come from, as a rule; what is the cause of them?—I suppose it is from pieces getting loose, and being left without any attention being paid to them for some months.

4426. Places that had gone beyond your reach?—Yes, out of reach from the ground, but we might reach them with ladders.

4427. If I understand you rightly, you say that a great majority of the accidents happen through carelessness on the part of the men, who are anxious to make wages?—Yes; my experience is that at least three out of every four of the accidents that happen, if not the whole of them, occur through over-haste or over-anxiety on the part of the men to make wages.

4428. Do you find that to be a great temptation to the men?—Yes, it is, to those who get rather small wages.

4429. Under those circumstances, do you think there should be some supervision over the men themselves?—Do you mean that the manager ought to superintend them, or how?

4430. Yes?—There should undoubtedly be some means of bringing us as workmen to exercise more consideration and care.

4431. Do not the lives of other men depend very often upon the action of one man?—Yes, very often. As a rule there are one or two men in every bargain on whom the responsibility chiefly lies, and these men, by their negligence, may bring about an accident which might result fatally to two or three.

4432. Do you know that the law holds the men and the masters responsible?—Yes, I have heard that, but I do not understand it fully.

4433. If that is so, do you think it is a sound principle?—No, I do not think it is. I have been talking that matter over on the way here with one of the witnesses, and we failed to agree.

4434. Do not you think the master ought to be held responsible as well as yourself for the proper carrying out of the work, so as to ensure the safety of your fellow-workmen?—Yes, certainly, he ought to be held responsible for its being done properly at first, but it might go to a state when you would not think it right to hold him responsible. Possibly I, by my negligence, might leave something which might be dangerous, and prove fatal to somebody.

4435. Can that happen sometimes owing to the manner in which the men have left the rock, or owing to the manner in which the work has been done?—Yes, it can happen owing to the unskilful way in which the work is done. It is very important always, in cutting the sides of the pillars, that they should be done by a competent workman, and not by a bungler.

4436. In cases of that kind should there not be special supervision to see that the place is worked properly, and left in a proper condition?—Yes, certainly, but I would expect the managers to see that that was done properly.

4437. Mr. Meyrick Roberts has told us that it would not be easy for them to do that in going round the bargains?—Yes. but I am speaking of the new bargain when it is commenced. In cutting free top they should see that it is safe, but after that, as we proceed, I might do many things in a day that the manager could never find out.

4438. Do you think that proper care should be taken before the place gets out of reach that everything has been properly done?—Yes, I do.

Mr. O. F. Williams.

Mr. Owen Francis Williams examined by the Chairman.

4439. Where do you live?—At Abergynolwyn.

4440. Are you a rockman or a quarryman?—A quarryman.

4441. Do you work outside?—Yes.

4442. In the mills?—Yes.

4443. And how long have you worked there?—I have worked at the quarry since I was 13 years of age, and I am now 50. I worked at Bryneglwys for 27 years.

4444. So that you have been working altogether for 37 years?—Yes.

4445. And have you worked all that time in the mills?—Yes, but sometimes I have had to go underground—when we were short of slates.

4446. Do you think you suffer in health by working in the mills?—No, not specially.

4447. Are you inconvenienced in any way by the dust?—No, I am not.

4448. Not at all?—No.

4449. Have you anything that you can suggest to us for improving matters at the quarries—above ground or underground?—No, I have nothing very particular. I consider that one of the most necessary things in the mills is that they should be kept free from draught.

4450. Is your mill draughty now?—The mill we have at Bryneglwys is very good.

4451. Did you hear the evidence given by Mr. Hugh Roberts, the last witness?—Yes.

4452. And do you agree with him generally?—Yes, I do.

4453. (*Mr. Jenkins.*) The mill you are in now is a new mill, is it not?—No, it is an old one.

4454. So that the old, as well as the new, is a very good one?—It is free from draught.

4455. Is it rain-proof?—It is only middling in that respect.

4456. Then there is room for improvement in that direction?—Yes, and they have promised to put that right, I believe.

4457. What kind of a place do you eat in?—In the weigh-house.

4458. Is there enough room in the weigh-house for you all?—Some go to the weigh-house, and others to the joiner's shop.

4459. Then you have no specially prepared eating-house?—No, we have none up at the top. There is one in the mill at the lower floor.

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4460. Do you think it would be a special convenience to the men if a proper eating-place were provided?—I do not think it would be an improvement at all, as far as we are concerned. We might just as well eat in the weigh-house.

4461. Have you a long distance to walk to your work?—Yes.

4462. And do you get wet sometimes on your way to the quarry?—Yes.

4463. What do you do in that case—do you work in your wet clothes?—We have to do so, or to go home.

4464. Do not you think that is injurious to your health?—Yes, it must be under certain circumstances.

4465. What would you suggest with the view to improving that state of things?—The best thing would be for the men to have two suits of clothes, and to leave one at the quarry so that they might change.

4466. You feel that the dust in the mill does you no harm?—No, none at our place, because we are pretty far from the place where the dressing machine is.

4467. In what way are you far off?—At Festiniog, as you know, they work nearer to the dressing machine than we do at Bryneglwys.

4468. And from that you think there is not so much dust?—It does not affect us so much, owing to the distance.

4469. How are the sanitary arrangements at your quarry—are there any privies for the use of the men?—There are some belonging to the barracks, but there are none for the workmen at the quarry.

4470. How many workmen are there at your quarry?—I do not know exactly. Mr. Meyrick Roberts can answer that question better than I can, but I should think there are about 200.

4471. That is above ground and underground combined?—Yes.

4472. And about half of that number work above ground?—Yes.

MR. MICHAEL ROBERTS examined by the Chairman.

Mr. M. Roberts.

4473. Are you the manager of the Aberllefenny Quarry?—I am.

4474. How long have you been manager there?—During the last 16 years.

4475. And what were you before that?—I was a quarryman.

4476. Where did you work?—At the Aberllefenny Quarry.

4477. What is the total length of your practical experience in and about quarries?—I have been in them since my boyhood.

4478. About how many years, roughly speaking?—About 32 years.

4479. What have you to tell us about improving matters at the quarry?—I take it that the object of the Committee is to prevent accidents, and I believe that the workmen, as well as the manager, have much to do in that direction. I always feel that all the workmen—miners, rockmen, and labourers—ought to consider, in carrying out their work, what their responsibility is in relation to their fellow-workmen. I do not believe that to legislate for the master and to leave the workman without legislation will help to prevent accidents. During the time I have been manager I go through the quarry, and pay the greatest attention to the different parts of the work, such as the covers, the chambers, chains and cranes, and so on.

4480. By "covers" you mean roofs?—Yes; we call them "covers" here. I tell the men if I see anything becoming dangerous, and call upon the men to inform me if they see anything wrong. As a general rule, I see more danger in a place than the men themselves do. I do not think I have anything else to say, but I shall be glad to answer any questions.

4481. Have you any barracks for your men?—No, we have not. Our men, with the exception of a very small number, live in houses convenient to the quarry; at least nine out of every ten of the men are able to go home, so that they do not require barrack accommodation.

4482. Do the others lodge in the village?—Many of them live in Corris and the district, and they eat at the quarry.

4483. (*Mr. Evans.*) I see that there has been one fatal accident from explosives in your quarry?—Yes.

4484. (*Chairman.*) The return states that the man was struck by a stone from a shot fired by another man. The shot took fire and went off prematurely while the man was preparing to ignite the fuse. Is that right?—Yes.

4485. (*Mr. Evans.*) It went off prematurely?—Yes.

4486. Can you give us any reason for that?—It was a hole under the hard. The cleavage in our rocks is perpendicular, and the "slips" dip at an angle, and we have to blast the rock from beneath the upper "hard" until we get the "hard" below in the foot-joints. The fuse took fire prematurely, and before the men could get out of the way it exploded, and threw a stone to the chamber.

4487. There was also one fatal accident between 1885 and 1892 from the fall of a crane?—I do not remember.

4488. (*Chairman.*) Their names were William Davies and John Davies?—That is before my time.

4489. (*Mr. Evans.*) You have been there for 16 years?—Yes.

4490. And it is not more than nine years since that accident happened; it is given in the return as having taken place between 1885 and 1892?—I think it was in 1875.

4491. But I am talking of accidents after 1885?—(No answer.)

4492. (*Chairman.*) There was an accident on the 2nd June, 1888: John Jones Williams, aged 20, unexpected fall of rock from about 30 feet above him while he was walking along.

4493. (*Mr. Evans.*) Did that stone come from any bargain for which the men themselves were responsible?—It came down from the side of a pillar.

4494. And the men had nothing to do with looking after that?—It appeared at the time to be an accident for which no one could be blamed. It came from the side of a pillar. It was what we call a "rotten post," and when the man was passing underneath about a barrow-full fell upon him. It was quite unexpected.

4495. Do you make any periodical inspection of such places?—Yes, very often.

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4496. You told us in your statement that you take notice of chains and other things in passing by?—Yes.

4497. Have you anyone besides yourself to inspect such things and to report upon them to you?—No, there is no one appointed but myself and my assistant.

4498. Do you think that you and your assistant are sufficient to do that work?—Yes, I think so.

4499. Do you consider the workmen themselves responsible for keeping their bargains safe?—I consider it is for the workman himself to keep his bargain in a safe condition, but I do not hold him responsible altogether.

4500. You consider that you are responsible to see that a man keeps his bargain safe?—Yes, certainly, for without proper supervision many a bargain might be spoiled through the over-anxiety of the men to make good wages.

4501. Do you think that the men are inclined to run a risk in a matter of that kind from any other motive than when he is working for low wages?—Yes, I believe so. I think he might do it more from want of thought than want of principle. A man might put a pillaring hole, as we call it, in the side of a post, and spoil the post by so doing. He might also make a mistake otherwise than from want of thought, and that might affect his fellow-workmen.

4502. (*Mr. Jenkins.*) You say you make periodical inspections?—Yes.

4503. With what means do you do that?—With candles.

4504. The word "roof" has been used, what do you mean by that?—The "cover." The formation of the rock is different here to what it is at Festiniog.

4505. The cleavage is perpendicular?—Yes, the roof is the same as what they call the "ceiling bôn" at Festiniog. I cannot point to any roof that became dangerous on the present principle of working.

4506. You have not seen them become dangerous?—No, not on the present principle of working—having them examined after the miners leave them. I always go there during the time the miner is there, and before he leaves it I always examine it myself.

4507. After the places go out of reach, by what light do you inspect them?—We have a kind of lamp, unless we can find it out by daylight, and we also use ladders, but it is very seldom that we get that trouble after we once make the "cover" safe.

4508. You very seldom use lights of any kind?—No, it is seldom we find any need for it.

4509. But when you do use them you use paraffin lamps?—Yes.

4510. Do you find the light they give sufficient?—I have been making torchlights myself to see places with. I do not say that you can see a crack or anything of that kind in a post far off with the aid of a paraffin lamp, but you can see for some distance.

4511. (*Chairman.*) Would it not be an advantage to have a better light?—Yes, very likely it would.

4512. (*Mr. Jenkins.*) Have you seen the Wells light?—No, I have not. I have got a paraffin lamp, and it gives a very good light.

4513. Does the upper "slip" sometimes get dangerous?—Very seldom, unless we meet with a slant, and we get that when it goes out under the chamber.

4514. The lower end of it?—Yes.

4515. Does that give way sometimes?—No. Sometimes we have to remove our chambers and have a new "cover." When we get a very loose joint we shift the "covers."

4516. (*Chairman.*) You mean that you cut the "cover" again?—Yes, we shift the chamber.

4517. (*Mr. Jenkins.*) How many floors have you in your quarry—one underneath the other?—We do not work in floors—only one chamber from top to bottom.

4518. How deep is that?—About 150 yards, or 100, or 50. It varies.

4519. Do you consider these quarries very dangerous from that point of view?—No, I do not, because the width above is only about 16 or 17 yards and you will have a cover from one side to the other.

4520. What is the width of your chambers?—It depends upon the quality of the rock.

4521. Entirely?—Yes, some are very small.

4522. What is the greatest width you have?—We consider 20 yards very good for length.

4523. From pillar to pillar?—Yes, some are 30 yards—one or two of them, but we do not complain if we get them 20 yards.

4524. Do many falls of ground occur in your quarry without resulting in accidents?—No, not very many. We are not troubled much with big falls. We find that some things get loose occasionally, and we clear them off.

4525. That is the case now?—Yes.

4526. You find that your vein is not very thick—do you consider it impracticable to work the thickness and afterwards fill it up where you have worked it?—Yes, it is quite impracticable.

4527. You could not work on a system by which you would get out the whole of the rock and fill it up as you go on?—No, you would spoil the quarry. The vein runs down deep into the earth and you must follow it down from the top.

4528. You do not cut floors underneath so as to make a cover to a lower part?—No, not unless we have something that calls for it.

4529. (*Mr. Evans.*) What do you think of the system of working five days a week instead of six, about which we have just heard; do you think the men can give you as much work in five days as in six—what is your opinion?—Speaking for myself, I would rather have five days than six.

4530. But what do you mean by that?—Well, it is less time for one to work.

4531. But what about the principle of the thing; do you think they can do as much in five days as they can in six?—No, I do not.

4532. (*Chairman.*) Or put it another way—do you think they do as much in five days as they did in six days?—That is a very ticklish question; but I do not think we can in five days do the work of six.

4533. (*Mr. Evans.*) You think it premature?—Yes.

4534. (*Mr. Jenkins.*) What do you think of the eight hours day, would it be an advantage?—I cannot say. I do not know what more than eight hours we work now taking the year all round. I do not think we are very much over it.

4535. What are your hours?—Ten hours for five days, and five hours for the Saturday in summer.

4536. That is 55 hours a week?—Yes.

4537. (*Chairman.*) Is that inclusive or exclusive of meals?—Exclusive.

4538. (*Mr. Jenkins.*) And what are the hours in winter time?—From light to light.

4539. What is your shortest day; have you any specific rule?—I should say seven hours a day for two months.

4540. What time do you commence in the morning in the winter, when the day is shortest?—Say 8 o'clock.

4541. And then, I suppose, you allow half-an-hour for dinner?—We allow an hour for dinner, and we leave off at 4.30.

4542. You have an hour for dinner all the year round?—Yes, because we have cottages so near to the place.

4543. And the men are able to get home for dinner?—Yes.

4544. Do you think that it is an advantage for them to have their dinners at home?—Yes, I think it is. They can get a warm meal there.

4545. And a better meal?—They can get what they like when they get home.

4546. And a better cooked meal?—Yes, no doubt.

4547. (*Mr. Evans.*) Can you tell us what date you commence to work 10 hours a day and when you give up?—No, I cannot say for certain.

4548. (*Chairman.*) Have you began the 10 hours now?—Yes.

4549. (*Mr. Evans.*) Did you begin on the 10th March?—Yes, at the beginning of March. I think we worked full time in March.

4550. When do you give up working 10 hours a day; what part of October?—Perhaps about the middle of October.

4551. What date do you think, the 20th?—Yes, about the 20th or 25th.

Mr. EVAN GRIFFITH examined by the Chairman.

Mr. E. Griffith.

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4552. You are manager of the Ratgoed and Cymerau quarries?—Yes.

4553. How many years have you been manager?—Ten.

4554. You have heard what Mr. Michael Roberts has said?—Yes.

4555. Do you agree with what he has said?—Yes, especially with regard to the responsibility—that it rests both upon the managers and men.

4556. (*Mr. Jenkins.*) You agree that the responsibility rests with the manager of seeing that the men perform their duty?—I look upon it in a wider sense than that, but that is one thing, no doubt. He is responsible for doing what he can to keep the men to their duty, but, as Mr. Roberts stated, they can do much without the manager being able to see, and that may result in an accident. I consider that the whole of the responsibility does not rest with the manager.

4557. (*Mr. Evans.*) How did the fatal accident happen at your quarry—I see there is one fatal accident?—Yes, there is only one in the course of 10 years. A man fell to the sink. He was working on the edge, and there was a chain close to him. We do not know how he did fall, but it is generally supposed that he had a sort of a fit or something of that kind. There was another man close to him, but he did not notice him fall.

4558. Do you think he could have fallen if he had made proper use of the chain?—No. The chain was close to him, and if he had used that, he could not have fallen down.

4559. Do you find that men are reckless sometimes, and that they do not use the ropes or chains?—Yes, they are, no doubt.

4560. Do you think that they should be compelled to use them?—You cannot compel them unless you are on the spot.

4561. Do you think a law should be made that a man should be punished for not using them?—I do not know about that, but it is a fact that they do not use them when they should do so.

4562. How many men do you employ?—We have only 30 or 32 between the two small quarries we have.

Mr. EVAN M. PIERCE examined by the Chairman.

Mr. E. M. Pierce.

4563. What are you?—A rockman.

4564. Are you a rockman at Aberllefenny?—Yes.

4565. And how long have you been there?—I have been working at the quarries for over 25 years.

4566. What were you doing before that?—I had been with my father on the farm. I commenced to work then; I went there first as a journeyman.

4567. For how many years were you a journeyman?—I have had charge of a bargain for 20 years.

4568. What improvements do you think desirable or necessary?—There are several points I wish to mention.

4569. I see that you wish to refer to the following points:—Proper paths to the quarry, that proper ambulance appliances be provided to remove those who have met with accidents, that better eating places be provided, that dust in mills be prevented, and that the ventilation be improved?—Yes.

4570. And you wish to say something about the hours of working in quarries?—Yes.

4571. Also, "That it would be desirable to appoint "an assistant or sub-inspector under Dr. Foster"?—Yes, that is the feeling of the men.

4572. And that it would be desirable to get suitable men among the jury at inquests?—Yes.

4573. Are these the seven points that you want to bring before us?—Yes, and to state a little of my experience.

4574. It would be convenient to take these points separately. When you say that better paths should be made to the quarry, do you mean better paths inside or outside?—Outside, more especially. When an accident happens at the quarry, it is a difficult matter to bring the injured man down from the quarry, because the paths are narrow and dangerous.

4575. Do you think the paths are dangerous for persons who are not injured?—Yes, I believe that is the case in some instances, especially when you have ice and snow, and after it gets dark.

4576. Are there many men using these paths at night?—No, not so many; but there are a few. I cannot say exactly how many there are.

4577. (*Mr. Evans.*) What sort of a path have you to go down to the quarries?—I can only speak as to my own bargain definitely and those which are immediately around me. The paths differ a good deal; some are better than others. We make them as well as we can.

4578. Will you describe some of those that you know?—I cannot refer to any now in particular, not those that are inside the quarry.

4579. Are they too steep or too uneven?—They are too uneven, and they are also rather steep in some places.

4580. (*Chairman.*) Have you ladders in some places?—Yes, we have.

4581. (*Mr. Evans.*) And are those ladders in good order?—Yes, they are.

4582. Have you a lean in them?—Yes, they lean a little.

4583. How long are they?—They vary from six to eight or ten yards.

4584. With regard to the paths outside the quarry—who is to look after them—do they belong to the quarry company or to the parish?—I should think they belong to the company.

4585. (*Mr. Jenkins.*) Are there precipices on either side of these paths where there is danger of men falling over?—No, there is not so much of that. When a man meets with an accident it would be a very desirable thing that two men should be able to walk side by side, but we have projecting rocks and such things generally at the side of the paths.

4586. (*Mr. Evans.*) What suggestion have you to make with regard to these paths?—I consider that they ought to be made wider and more even, where they are not so already.

4587. (*Chairman.*) Do you refer to the paths inside the bargains, or do you mean the levels?—I am now referring to the paths outside, which lead up to the quarry.

4588. (*Mr. Jenkins.*) Is it along these paths that you have to take a man who meets with an accident down from the quarry?—Yes, most frequently.

4589. (*Chairman.*) But can he not be sent down along some of the inclines?—That can be done sometimes, when the place is very difficult.

4590. (*Mr. Jenkins.*) So you have no paths where there is danger of men falling over?—No, there are none that are not properly fenced.

4591. Can you tell us at what angle the ladders are put generally?—No, I cannot say for certain. There is about a yard and a half of a base.

4592. (*Chairman.*) You also suggest that a proper ambulance be provided to remove those who have met with an accident?—Yes.

4593. Have you any appliances at the present time—such as a stretcher—that a man can be carried on?—No, we have not.

4594. Do you think that the rule in the Coal Mines Act should be enforced in quarries—rule 34, which provides that "where persons are employed underground "ambulances or stretchers, with splints or bandages, "shall be kept at the mines ready for immediate use in "case of accident"?—Yes, that would be a very good rule. It is the opinion of the men that something of that kind ought to be in readiness for the comfort of those who meet with accidents, and that they should be kept in the joiner's workshop.

4595. Have you had any ambulance classes in this district?—No, we have not, as far as I know, but there

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are some men who are more skilful than others in the use of such things.

4596. Do you not think it would be an advantage if you had instruction of that kind?—It would do no harm, and it might add to the comfort of the men.

4597. Possibly you are not aware that the men are taught in these classes how best to remove an injured man with the least danger and pain?—I have heard that some have been taught in that way.

4598. Do you not think it would be an advantage if classes of that kind were established at Corris or Aberllefenny for giving instruction to the men?—I do not think it would do any harm, and it might do good.

4599. (*Mr. Jenkins.*) You have no kind of appliance, you say, to carry an injured man?—No, we have nothing special.

4600. They are carried anyhow?—I saw a door being removed from a weigh-house on one occasion for the purpose of carrying a man.

4601. And when a man is injured there are no bandages or splints or anything of that kind at the quarry?—No, I am not aware that there is anything. I have never seen any.

4602. Have you a medical man belonging to the quarry?—Yes.

4603. How do you pay your medical man?—We pay him 1*s.* per month of four weeks.

4604. And does that all go to the doctor?—Yes.

4605. What does he do for that 1*s.*, does he attend the family as well as the workman himself?—Yes, he attends the children until they begin to work themselves, and then have to pay the 1*s.*

4606. Is that 1*s.* per month kept back at the office?—Yes.

4607. Do you regard him as the doctor of the workmen or of the employers?—(*No answer*).

4608. Who appoints him?—I cannot say. I look upon him as the employers' doctor. When the selection was being made last a committee was appointed in the neighbourhood, made up of workmen and agents.

4609. So that practically he is chosen by the men?—Yes.

4610. Do many accidents occur in this district that are not fatal?—There are a few, but not many.

4611. What is the nature of those accidents?—The majority of them take place through the carelessness of the men themselves.

4612. Will you explain in what way that happens?—I consider that when a man takes a bargain it is an important matter, as there are lives in peril in his bargain, and if he is not very careful accidents will take place there. I can only refer to a few accidents during the last 20 years in the bargain I worked in. Some have happened with the cranes, but there is a great improvement in this respect of late years, so that it is now impossible to meet with an accident in using them, except owing to sheer negligence.

4613. Do you mean that improvements have taken place in the construction of the cranes, or that fewer accidents have happened?—There have been improvements in the construction of cranes during the last few years, and these have reduced the number of accidents.

4614. What is the nature of the improvements you refer to?—A ratchet and pawl has been introduced.

4615. And after that was introduced you say the number of accidents has been less?—Yes. I am not aware of any accidents in the part of the quarry where I work after that was put on the cranes.

4616. In what other way do accidents of this kind happen?—The vein is a narrow one, from 15 to 17 yards wide. We cut the "cover" only half that width, and every care is taken by the manager.

4617. He takes every care to see that it is safe at first?—I cannot refer to any accident during the time I have worked there, except, perhaps, from falls from the roof. The lengths from foot-joint to foot-joint do not exceed four yards. It is an exceptional thing for them to be more than that. When a great length is being cut, the foot of it gets rather far into the underlying hard. In removing the next depth, a step must be left to afford strength to the hard, and consequently rubbish, caused by blasting, settles on this step. I would suggest that these steps should be cut in a sloping position to prevent rubbish from settling on them. We try to do that in our bargain.

4618. (*Chairman.*) You also want better eating houses to be provided?—Yes.

4619. What have you now; where do you eat your dinner generally?—Some of the men eat in the weigh-house, and others in a small hut which they have built for themselves.

4620. Do not many of the men go home for dinner?—There are about 10 or 12 of the men who work in the side where I am who do not go home, and about the same number—or perhaps a few more—from the other side.

4621. Are their homes too far away?—Yes. I have heard it said that some of the men, who go a considerable distance now, would not go home to eat if a convenient place were provided at the quarry.

4622. (*Mr. Jenkins.*) What distance have they to go for their dinner—those men who do go home?—About a mile, I should think—perhaps a quarter of an hour's walk.

4623. And there is a general feeling among the men that eating places would be desirable?—Yes, there is.

4624. (*Chairman,*) Dust in mills and ventilation,—that is your next point. Do you suffer from the dust at all?—I have never worked a day in the mills, so that I cannot say anything as to that. There is another witness here who will speak on that point.

4625. Then what have you to say as to the hours of working in the quarry?—We work 10 hours a day, from 7.0 in the morning to 6.0 in the evening.

4626. And what interval have you for dinner?—An hour.

4627. What do you wish to say about the hours?—The feeling amongst the workmen generally is that 8 hours' work, especially underground, is quite enough. The place is dark and smoky and damp.

4628. (*Mr. Evans.*) You heard the men from Abergynolwyn say that they work only 5 days a week?—Yes.

4629. And that they work less by 5 hours a week than they did formerly. What is your opinion—do you think you could do the same amount of work as you do now if you worked 5 hours less per week?—I cannot say that.

4630. Have you ever been considering that matter at all?—No, I cannot say that I have.

4631. You are now working 10 hours a day and you want to work 8?—Yes.

4632. Do you think you could do as much work in 8 hours as you do now in the 10?—Yes, in my opinion we can do as much in 8 hours as we do now in 10.

4633. You do not want to remain at work for more than 8 hours at a time?—That is all. We consider 8 hours quite long enough, and quite as much as a man's body can stand without suffering from it.

4634. Do you mean to put in 8 hours' work every day throughout the week?—No, we want to have the Saturday half-holiday, and we are willing to work a little more than the 8 hours on other days to make an average of 8 hours per day.

4635. (*Mr. Jenkins.*) What you mean, therefore, is to have a 48 hours' week?—Yes.

4636. Your objection to the 10 hours is that it is too much to work underground?—Yes, that is so.

4637. Do you consider that to work underground is unhealthy?—Yes, I do.

4638. For what reason?—For the reasons I have already given. The place is damp and dark, and there is a good deal of smoke there.

4639. How many hours do you work in the winter time?—It varies according to the day. We work from light to light.

4640. You follow the day, morning and night?—Yes.

4641. Would you prefer to have 48 hours a week for six days than to have five days of 10 hours each?—Speaking for myself I would rather have six days of eight hours each.

4642. (*The Chairman.*) Your next point is "that it "would be desirable to appoint an assistant or sub-"inspector under Dr. Foster." What do you wish to say about that?—That a practical working quarryman should be appointed in that capacity, who has worked a good deal underground and who understands Welsh. He should visit the quarries pretty frequently.

4643. If he has had practical experience in quarries, and can speak Welsh, you would be satisfied?—Yes.

4644. (*Mr. Evans.*) What do you mean by a "practical quarryman"—what time do you consider is sufficient for a man to become practical, and to become qualified for a post of that kind?—Say 20 years.

4645. Do you mean 20 years working on the rock, or as a quarryman and rockman?—20 years as a rockman is what I meant specially.

4646. How do you consider a man becomes a practical rockman?—A man who has had experience underground, as I said before.

4647. And a man who has had that experience for 20 years?—Yes.

4648. At what age do you think a man should commence in the quarry to become a thoroughly practical man?—In this district we begin to work underground when we are from 16 to 18 years of age.

4649. Then you consider that a man, to become thoroughly practical, should begin at about that age?—Yes.

4650. Would you go further than that and say that a man who begins after reaching 25 or 30 years of age will never become a thoroughly practical man?—I must say that it is a great disadvantage to him, but of course there are exceptions to every rule.

4651. But as a rule you think that is the case?—Yes, I do.

4652. How many years do you think a man should work underground before he is allowed to undertake the charge of a bargain?—From five to six years.

4653. If you heard a man say that he had learned the trade in two years, what would you say?—Of course there are exceptions. Some men learn years before others, but as a rule I think five or six years should be the time.

4654. (*Mr. Jenkins.*) Is that a general opinion among the workmen in this neighbourhood, that an assistant inspector should be appointed to assist in this work?—It is in our quarry, and I am simply bringing that message on behalf of the workmen in general.

4655. They consider that he should be a practical man?—Yes.

4656. When you say a "practical man" do you mean a practical rockman or a practical slate-maker?—A practical rockman.

4657. And a practical quarryman would not meet the case, you think?—Not so well.

4658. (*Mr. Evans.*) How do you define a "rockman" and a "quarryman" here,—I think it is important that the Committee should have your definition?—By a rockman we mean a man who works underground, and by a quarryman a man who splits and dresses the slates above ground.

4659. (*Chairman.*) Have you not men who work underground who are not rockmen?—(*No answer.*)

4660. Have you not miners?—Yes.

4661. (*Mr. Jenkins.*) And labourers?—It is the miners, as a rule, that cut the "covers" and open the bargains.

4662. You mean by "rockmen" the men who cut the slate rock ready for the slate-makers?—Yes.

4663. Have these men better advantages for understanding the rock and the places than the other classes?—Yes, they have, undoubtedly. No one can know better than the men who work underground in the place.

4664. Are they distinct classes in this district, or do they change places. Do the rockmen go out to work the slates, and the slate-makers go underground to work?—It is very seldom that they change in that way, but the men who work above ground sometimes go underground when there is only a little slate to be got.

4665. When they do that, do they work under the direction of the rockmen and assist them, or do they take charge of the rock themselves?—They work under the direction of a rockman.

4666. They do not profess to know much about it themselves?—There are exceptions. Some men like to express their own opinion.

4667. But, as a rule, they do not profess to know much about the rock?—No.

4668. (*Chairman.*) You also say that it would be desirable to get suitable men among the jury at inquests?—Yes.

4669. Will you explain your views on that subject?—The feeling among the men is that it would be desirable to have practical quarrymen on the jury.

4670. Would you be satisfied if you had half the jury composed of quarrymen, or rockmen, or persons employed in quarries, and half of tradesmen or outsiders?—Yes, I believe that would be acceptable.

4671. Then you would like the coroner to instruct the police constable to summon upon the jury, if possible, one half of the number from among persons employed in or about quarries?—Yes.

4672. Of course you are aware that men working in the same quarry as the deceased cannot act as jurymen at an inquest?—No, I did not know that.

4673. (*Mr. Jenkins.*) Have you experienced any difficulty in getting evidence at these inquests?—I cannot answer that.

4674. We had evidence at the previous sittings that it is very difficult to get at the truth in the evidence given at inquests; can you say anything as to that?—No, I have no personal experience of anything of that kind, as I have never been at an inquest, but things of that kind are being said in the country.

4675. Would you recommend that the men should have the right to have themselves represented at inquests by a solicitor or someone else?—Yes, speaking for myself I would recommend that.

4676. (*Chairman.*) Is there anything more you wish to tell us?—No, I do not think there is.

4677. (*Mr. Jenkins.*) We had evidence at Festiniog that it would be desirable to have an inspector to examine all the places before they go out of reach—an inspector under the management—and that he should keep a record of his inspections, and that a periodical inspection be made of every chamber, a record, which may be seen by the Government Inspector, to be kept in a book—would you approve of something of that kind?—It would not be an undesirable thing.

4678. Do you think that it would tend to prevent accidents?—It might in some cases.

4679. Is it your experience that men are apt to leave dangerous things if they are left entirely to themselves?—There are exceptions, of course. Some men are more careless than others, but they are are not deliberately careless, in my opinion.

4680. Are they apt to be over-hasty in their anxiety to make good wages, and does that tend to make them leave things that ought to be attended to?—I have seen men of that kind.

4681. To meet cases of that kind, do you think it would be desirable to take proper care to see that those men are compelled to be more careful?—Yes, by all means.

4682. (*Mr. Evans.*) I believe you said that most of the accidents took place in consequence of the carelessness of the men themselves. Can you describe some of the accidents you were referring to when you gave that answer?—I cannot do so at this moment. The notice for this meeting was too short, and the evidence in consequence, has been taken in a less orderly manner than would have been the case if we had received longer notice of this sitting.

4683 But you are conscious that that is the case, that most of the accidents are attributable to the carelessness of the men?—Yes. No important accidents have occurred in the place where I work, but I have seen slight accidents.

4684. Some of the witnesses have suggested that there should be legislation to compel the men, as well as the managers and owners, to keep the rules. Do you think that the men should be compelled to keep the rules as well as the managers?—Yes, I thoroughly believe that.

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4685. You think the same rule should apply to the one as well as the other?—Yes, I do.

4686. Is it your experience that many accidents happen through falls of ground from places beyond the reach of the workmen?—No, I have seen but little of that.

4687. You have only seen a few which resulted in accidents?—Yes, that is all.

4688. But do many things of the kind fall?—As far as I am aware I only know of one accident from a fall from the roof.

4689. When a thing falls from a high place like that, and an accident results, whom do you hold responsible for it?—We cannot hold anyone responsible for that, as the roof will have been kept perfectly safe when within reach. When we widen the chamber a free side will be left to the roof, and it is more liable to give way than the roof, as there is no room for it to move one way or the other It is only fair to Mr. Roberts that I should say that when any extension is made in a bargain he consults the men, though, of course, as manager, he has the power to say "Yes" or "No," and I consider that a sign of great strength in a manager.

4690. When a fall such as we have referred to takes place, and results in an accident, can the workman be considered responsible when it is beyond his reach?—No, certainly not.

4691. In cases of that kind are the owners responsible to a greater or less degree?—No, I cannot say that either; because they had made the work as safe as it could be made.

Mr. E. Jones.

Mr. ELLIS JONES examined.

4692. (*Chairman.*) What are you?—A rockman.

4693. How long have you worked as a rockman?—For 44 years.

4694. Have you heard the evidence of Mr. Pierce?—Yes.

4695. Do you agree with that?—Yes; I think he is very near the mark.

4696. What would you like to add to what he has told us?—I have nothing to add to what he has said. I quite agree with him.

4697. (*Mr. Evans.*) Where do you work?—Voel Grochon is the name of the mountain, and the quarry goes by the same name.

4698. Do many accidents happen there?—No. I have worked in the same bargain for 40 years.

4699. Is yours part of the Aberllefenny Quarry?—Yes, it is the other side of the mountain. There are two places. The agent has divided some land, and many of of us have land to keep a cow or two, so that we have plenty of milk for our own use, and we give others the opportunity of buying milk.

4700. (*Mr. Jenkins.*) Do you consider that an advantage from a health point of view?—Yes, I could not live for a day without milk.

4701. How old are you?—I am 62 to-day.

4702. And you attribute the excellent health you enjoy to the fact that you drink a good deal of milk?—Yes, I do. I could not live on tea.

4703. Then you believe that the allotments are an advantage to the men?—Yes, I do. When I was working 40 years ago, we could not get any milk. All the land was held by one man; and there was scarcely any milk to be got.

4704. And the people in the neighbourhood who have no land buy milk from you?—Yes, they do.

4705. So that its benefits are divided amongst the many?—Yes.

4706. And are these small allotments let at a moderate rent?—Yes, they are. I pay 19*l.* for land for four cows.

Mr. W. Owen.

Mr. WILLIAM OWEN examined.

4707. (*Chairman.*) What are you?—I am a stone-cutter at present.

4708. At what quarry are you working?—At Aberllefenny.

4709. And how long have you worked there?—For 35 years.

4710. You have worked there ever since you began to work first of all?—Yes, except that I have been away from there for a little—perhaps for three or five years.

4711. Are you working in the sheds?—Yes.

4712. Making slates?—I make slabs, cisterns, and tombstones, and so on.

4713. Have you heard what Mr. Pierce told us?—Yes.

4714. Do you agree with what he said?—Do you mean with regard to working?

4715. Yes?—Yes, I do.

4716. And also as to the eating-houses and paths?—Yes.

4717. And as to an assistant inspector?—Yes.

4718. Do you also agree with what he said as to suitable men for the jury at inquests?—Yes, as far as I understand the question.

4719. Have you anything special to tell us about dust in the mills, or ventilation?—It was with regard to that matter that I was asked to come here to give evidence chiefly. There are complaints amongst the men on that head.

4720. Do you suffer at all from the dust?—I work in a building where there are a large number of men planing and sawing slates, and consequently there must be a good deal of dust, and there is no place for it to go out except through the doors.

4721. Do you think you suffer from the dust in any way?—I should think I do. I believe there is a good deal of pyrites in it, and we used to regard that as poison, but a gentleman told me the other day that it is not so.

4722. Do you feel any bad effects from it; do you suffer any illness?—Yes, I believe I do.

4723. In what way?—Indigestion generally. We suffer a good deal from that.

4724. Do you think the dust causes indigestion?—I cannot say for certain, but the general opinion among the men is that it does.

4725. Do the other men—the men who asked you to come here—suffer from indigestion?—Yes, I believe they do, several of them. I know of some, at any rate, who do.

4726. Do they suffer from anything else besides indigestion?—No, nothing specially, as far as I am aware, but I have no doubt myself that the dust has an injurious effect on the respiratory organs. I know some comparatively young men who complain in that way.

4727. What would you suggest as the best means of preventing that?—When we met to talk the matter over it was suggested that there should be a place at the top to let the dust out.

4728. Would you approve of the place being watered in summer to keep down the dust?—They do a good deal in that way, but there is nothing specially prepared for the purpose of watering. Some dust rises from the ground as the men walk, but the greater part of it comes from the saw, and it has to pass the men before it goes out through the door.

4729. (*Mr. Evans.*) Do any of the men complain of indigestion at your quarry besides those who work in the mill?—Yes, I believe there are some,

4730. Do many people in the neighbourhood, who do not work in the quarry at all, complain of indigestion?—I cannot say anything as to that, but I believe it is less prevalent among them than it is amongst the quarrymen.

4731. You believe there are more who complain of indigestion in the quarry than outside of it?—Yes, I have no doubt about that.

4732. (*Mr. Jenkins.*) Do you think that you inhale a good deal of this dust,—that it enters your lungs?—Yes, I think so.

4733. Have you any proof of that?—A good deal of it sticks in the nostrils, and is ejected from time to time, and proves that a good deal enters the lungs.

4734. Do you spit much dust?—Yes, I have noticed a good deal at times.

4735. You can see it?—Yes, or at least I fancy so; but there is not so much there as in the nostrils.

4736. Do you find that the dust is painful to work in?—I feel nothing from that.

4737. It causes you no pain?—No.

4738. (*Chairman.*) Does it cause you any cough at all?—No, none at all.

4739. (*Mr. Jenkins.*) Do you feel weak and faint and thirsty there at times?—Yes, it certainly affects one in that way.

4740. Would you approve of a plan of watering the place periodically by means of an india-rubber pipe?—That would be a far better plan for watering the floor than anything else, but I do not see how it would prevent the dust from ascending. When we are sawing, the dust rises from the teeth of the saw.

4741. Do you saw them dry?—Yes, they are perfectly dry. There is no water at all.

4742. Would it not be better for the saw to turn in water?—They have been trying that, but I do not think it succeeded, and they had to give it up. Water was placed underneath the saw.

4743. If that was done the dust would not rise, would it?—There is always a little dust. It cuts the slate dry after all, when the teeth enter the slab.

4744. If ventilators were placed in the roof do you think the dust would go out that way?—I believe it would. It goes up as it is, and I fail to see why it would not continue to go up and pass out if there were an opening.

4745. Do you not think that, after ascending to a certain height, it descends by its own weight?—No; if it ascends 2 yards it may as easily ascend 4 yards.

4746. Have you any privies at your quarry?—No, and the men complain of that.

4747. The men desire to have privies provided?—Yes. We had only a very short time to prepare our evidence; but that was put down as one of the things we were to call attention to.

4748. Have you a good supply of drinking water?—Yes; that is right enough.

4749. (*Chairman.*) With regard to the complaint about the short notice, I may say that communications were sent out some time ago inviting the men to give evidence.

(*Mr. G. J. Williams.*) I should like to explain that two or three names were given to me about three or four months ago as those of persons likely to give evidence, or to arrange for witnesses, and I wrote to them, but they replied that they did not know of anyone who was prepared to give evidence. I did not know whom else to write to. One of the men I wrote to replied on the 12th January last to the following effect:—"I received "your kind letter to-night on my return from the "quarry. I have no intention to come there to give "evidence before the Committee, as I have nothing "new to say, for I work outside. I have been speaking "to all the quarrymen who are considered the leaders "in this district, and not one of them is prepared to "give evidence. I would expect some of my fellow "workmen who work underground to be ready to "come forward, as an opportunity of the kind only "occurs once in a life-time."

Miss Winifred A. Ellis, of Cynlas, examined.

4750. (*Chairman.*) I believe you have been delivering lectures on cookery?—Yes, I have.

4751. Under the Merionethshire County Council?—Yes.

4752. Have you prepared some remarks for the Committee?—Yes, I have prepared a few remarks.

(*Miss Ellis then read the following statement.*)

I have delivered two courses of lectures on plain class cookery in four centres in Merionethshire, viz., Festiniog, Harlech, Corris, and Abergynolwyn, all of which are situated in the quarry districts. I regret that, owing to the classes being demonstration classes, I was not able to find out the real capacity of the people in this subject as much as if they themselves had taken a practical part in them. On the whole the classes were remarkably well attended, and a genuine interest was taken in them. Admirable preparations were made for them in most of the centres, and the local committee even went round canvassing and inviting the people to come to the classes, which were free. Many gladly consented to come. Some, after persuasion, agreed to come the first day to see what was going on, and others absolutely refused to promise, giving as their reason that they knew as much as they cared to know, and that they were able to cook the little they could afford to purchase. I can testify that the first set referred to mostly attended without missing a lecture, and those who acted as critical observers the first day were favourably impressed, and found there was something to be learnt, and so attended regularly before the end of the course. Not only did they attend themselves, but they brought their influence to bear on the sceptical ones, and induced some of them to give their presence at the classes. In my lectures I tried to make clear the best means of dividing money for purchasing provisions, and of cooking them in such a way as to obtain the greatest amount of nourishment from them. I made a special point of cleanliness and economy; that economy does not always lie in buying the cheapest materials, or even in making bargains, but it is cheaper in the end to pay a little more so as to ascertain that they are good and wholesome. It is a most essential point to good health to have sufficient variety in diet, as the human body is composed of different elements and compounds, and we need the same composition in our food as there is in our bodies to keep them in repair.

Incessant tea-drinking is undoubtedly becoming a real calamity to the physique of men and women. To neglect porridge, oatmeal cake, "bara-llaeth," "cawl," and "shot," in favour of tea three or four times a day is to destroy the stamina, to induce indigestion and dyspepsia, and to bring about enfeeblement of body and mind. Tea has such a charm for such people that they are sensitive about putting away the cups and saucers when they are not actually in use. Tea often serves as breakfast, dinner, and supper, the only accompaniment being bread and butter, and sometimes tinned meat. This is obviously insufficient for a hard-working man or woman, and the harder a man works the more food he will need, and that wholesome and nourishing. I regret that, in some cases, the women prefer to cook pancakes swimming in butter, with tea, than a good substantial dinner. Great ignorance prevails as to the value of soup as a food. In one of the centres at which the classes were held, I made a highly nourishing food from 8 lbs. of meat, and offered to sell it at a very moderate price, but I did not sell a pint of it, and was obliged to give it away. The meat, however, from which it was made was in great demand, although I gave instruction and carefully showed that I was making the soup in such a way as to extract the flavour and nourishment from the meat into the water. I might mention that I was told, but cannot say whether it is a fact, that some of the people roast a joint for Sunday and serve it hot, but that they rarely think of eating it cold or making it up for another day, although perhaps half of it is left. It is a common thing among quarry people to have their wages paid them on Saturday morning and go to the shops on Saturday night and spend the best part of them, live in comparative luxury for a week, and for the next three weeks live very scantily till they receive another month's wages. I think it would be a wise plan to pay wages weekly. It would tend to a more even and sensible domestic economy.

A branch of cookery which needs reforming is that of the sick room. Many people have but little idea how to make beef tea, mutton broth, and other essentials to the diet of a sick person. It can hardly be expected for an invalid to make progress without nourishing food and careful nursing. Undoubtedly, scores of sick people suffer incalculably from neglect in these two points. A doctor often refrains from ordering a poultice because he knows that, although sadly needed, such a one as would be made would do the patient more harm than good. Sometimes a poultice is made in an inferior manner to begin with, it is carelessly and roughly put on the patient and allowed to remain there till it is as cold and as hard as a stone. Ventilation is also much neglected.

Miss W. A. Ellis.

April 1894.

In some houses a sick person lies in a room breathing the same atmosphere for weeks, and sometimes for months, on account of the windows not being made to open. And even when the windows are properly constructed, the fact is often forgotten.

The need for technical instruction in schools is very urgent. Drawing has been made compulsory in elementary schools, and I think it is high time that cookery should be made compulsory for girls, and that far greater stress should be laid upon careful and continuous teaching of domestic economy.

In intermediate schools, nursing should be taught as well as cookery. I am convinced that much suffering in the homes of the working poor could be avoided if means were taken through schools and lectures to spread knowledge as to the proper nourishment and care of the sick.

County Councils and District Councils should continue their courses of lectures and demonstrations until the old prejudices, carelessness, and ignorance as to food and its preparation are driven away. This can only be done by having a course every year, or every two years, in working-class centres.

I hope that the Committee will see its way to recommend the weekly payment of wages, for the sake of regularity in domestic economy and to help to weaken the "credit" system.

4753. Then you are decidedly of opinion that there is a want of economy among the quarrymen's wives in the matter of food?—They do not make the very best of their materials.

4754. And that the men are not well fed?—It is my opinion that many of them are not.

4755. And that there is too much tea drinking?—Yes, considering the nature and surroundings of the quarrymen's work.

4756. And you would suggest, as an improvement, that the girls should be taught more about household work?—Yes.

4757. That is to say, cooking, domestic economy, and nursing?—Yes; that the present generation may be brought up in a proper manner.

4758. (*Mr. Jenkins.*) Have you reason to believe that the instances you have mentioned are general, or are they isolated cases?—They are isolated, more or less. I have mentioned them as being in one town.

4759. In one town in the county?—Yes. I suppose you mean the instance about the broth?

4760. Yes.

4761. (*Mr. Evans.*) Do you think the wives could provide what you recommend at the same, or less, expense, compared with what they spend now in their present mode of living?—It might cost a little more, but they might turn it to a better purpose in the end.

4762. Can you give us any idea of what the extra expense would be for a family of four or six, say?—In cooking a joint they might make it go very much further than they do. They might cook it for Sunday, and make it up for another day. If they are not a large family, a joint might provide for three dinners, or even four.

4763. So that a joint would do for three days, whereas it is finished with now in one?—Yes, in some cases.

4764. It would therefore make more meals?—Yes.

4765. And in the end it would be cheaper?—Yes, I think so.

4766. (*Chairman.*) Do you think there is a want of thrift; are the quarrymen's wives extravagant?—There is a want of thrift, in that they do not make the best use of their materials. Some are extravagant in the cases I have already pointed out. I do not by any means imply that they are lazy as a class of people, but some are, and are given to gossip. It is my opinion that they do not spend enough time at home. I have heard from very good authority that some of the women go to each other's houses when the men are at work, and when it is time to return they go to their houses and buy tinned meat for their husbands, instead of preparing a nice little dish for them.

4767. (*Mr. Evans.*) Do you recommend pancakes?—No, except on Shrove Tuesday, and such occasions.

4768. I heard in a meeting lately that that was the reason why there were so many old bachelors—that the women are so extravagant?—I do not care to express an opinion on that point.

4769. It is your opinion that the wives of the quarrymen are rather backward in their mode of living?—In some respects.

4770. (*Mr Jenkins.*) Are they more backward than the wives of other classes of workmen?—What other classes.

4771. The wives of farmers and joiners, and so on?—No, when you come to compare them, they are not.

4772. (*Mr. Evans.*) There are more of them in the same district, and they go together?—Yes.

4773. (*Chairman.*) Are they more extravagant in dress than a farmer's wife?—I think they are fonder of dress.

4774. (*Mr. Jenkins.*) Your remarks apply to the whole county?—Yes, some of them do.

4775. And to the whole of the quarry districts?—Yes.

4776. And not to any particular district?—No.

4777. (*Mr. Evans.*) Do you think they dress in the best manner for themselves, or do they go in for fineries?—I think they are fond of gay dress, whereas a quieter dress would be more becoming.

4778. How young should a girl begin to take the lessons you have been speaking of?—I think she ought to begin at 13 or 14.

4779. Do you recommend that plain cooking should be taught, or what?—Yes, plain cooking, most decidedly.

4780. You would not teach them to make cakes?—I would teach a few cakes.

4781. (*Mr. Jenkins.*) Are you of opinion that they do not get good food, or that they do not get it cooked properly?—Some do not get it, and those who do get it do not make the best use of it, *i.e.*, in a good many cases. Of course there are exceptions to all the remarks I have made.

4782. Do you think they do not consume enough meat?—I do not think they consume enough fresh meat.

4783. In either of the quarry districts?—No, and they do not drink enough milk, which I think is as nourishing as meat.

4784. What about vegetables?—They are not very partial to them.

4785. Do you recommend them?—Yes, I do certainly—green vegetables especially.

4786. And you are against tea?—Yes, when taken in excess.

Statement handed in after the meeting.

I have known the quarry district of Corris for a considerable time, and have at times visited the quarries.

Many of the quarrymen appear pale and languid and are of weak constitutions. This is mainly the result of their occupations. The underground men frequently work in a damp, cold, and draughty atmosphere, and are very liable to inflammations of the chest, and of indigestion, from which they suffer. The engine sheds have dust constantly floating in the air, and the construction of the sheds by which the openings on each side of the buildings are opposite to each other, induce cold draughts to pass through which is injurious to health. I am told that the workmen may close the doors after letting the loads in and out. The sheds are now better provided with doors than formerly, and more are likely to be put up.

Frequent complaints are made of water being allowed to run between the rails in the levels, instead of being diverted to the side channels, which must affect health. The constant running of water into unseen crevices in some quarries causes falls and accidents.

Remarks have been made here and at Festiniog charging quarrymen with excessive tea drinking. I consider this requires a qualification in justice to the men. They are forced to it by the nature of their occupations. They work under very different conditions to farmers and mechanics. The underground men are working in a dense, foggy, and frequently unwholesome atmosphere, and the engine sheds being dusty, causes thirst, with weak appetite and digestion. A butcher here told me that he cannot sell fat English mutton to quarrymen, their stomachs being so delicate.

I say it is not fair to attribute to quarrymen the fact of being possessed of an unnatural and excessive craving for tea drinking. Tea allays thirst. It is a necessary stimulant, though not much more, but it helps the

assimilation of nourishing food. But it is quite erroneous to suppose that quarrymen and their families in this district, however it may be in other centres, depend on tea, cakes, and tinned meat. They love a variety of food as other classes within their means. Their fine annual Garden Show proves their partiality to vegetables. They also consume a fair quantity of fresh meat. They consume much more than farmers do. In this district, with a population of 1,800, there are 10 shops supplying fresh meat. This is sold not at pay-time only, but every week throughout the year. The village of Corris is supplied with milk by seven farms or allotments. Still, more allotments are required at Corris, so that milk may become more available. Milk is dear, viz., 4*d.* per quart.

I consider it is advisable that the inspector of quarries should be invested with authority in sanitary matters, in addition to his present powers as regards explosives and dangerous places.

In my opinion the underground quarrymen should be included in a Miners' Eight Hours Day Bill. There is a consensus of opinion among the best workmen that 48 hours a week is the limit of hard work. Some managers admit this.

To render the working of quarries safe and healthy, there must be co-operation on the part of the employer and the employed. The former should recollect that by proper precautions he can do much to avert accidents and disease among his men, whilst the latter must recognise that they owe a hearty obedience to rules and regulations framed expressly to promote their welfare.

MORRIS THOMAS,
County Councillor,
Corris.

MR. TREGLOWN'S REPORT.

114A, Queen Victoria Street,
London, E.C.
October 3rd, 1894.

I HAVE examined the various underground slate quarries of Festiniog, with a view to determine the possibility of liberating the slate from the rooms or chambers by mechanical means, and thereby do away with the old style of blasting a channel 3 to 4 ft. wide and wasting from 5 to 15 per cent. of good slate. (Of course, the per-centage of waste depends upon the size of chamber.) The greatest objection to the old system is the existing danger to life, which arises through continual blasting. As the chamber is being carried downwards, large and irregular walls are left on the sides, and consequently there is always the chance of loose pieces of rock falling out; and, however careful the workmen may be, accidents have and do continue to happen through this.

I believe machines of the type which I propose to recommend have never been used underground; but after a thorough and careful examination, and from practical experience I have had with machines on the surface, where they have worked under the same conditions which exist in the underground quarries, excepting the roof and daylight, which will make no material difference to the successful operation of the proposed machines, I am convinced they will do the work more cheaply, give satisfaction in every respect, and reduce the liability to accidents, these being the most important points.

In preparing a room to be operated upon, a sufficient distance must be left (say, about 5 ft.) between roof and floor to accommodate the height of the machine. It is usual to leave 3 ft. 6 ins. to 4 ft. when working rooms or chambers by hand, but I understand it will be quite as convenient to allow 5 or even 6 ft.; and by doing this everything is favourable for the application of what is termed a "broaching" machine, which is made and sold very extensively in the United States of America by the Ingersoll-Sergeant Drill Company, of 114A, Queen Victoria Street, London.

This machine consists of a special rock-drill working on a traversing bar mounted on four legs, and works equally well with compressed air or steam; but for underground work I should recommend air, it being much cleaner, and also assists ventilation. The broaching operations are begun at the top of the chamber, where a small hole is bored by hand to a depth of 12 to 15 in.; an iron rod is then driven in, a rope is fastened to a ring on the machine and is securely tied to the rod, thus holding the machine in position, and by the use of four weights—one on each leg—it is kept steady. A series of holes is then bored to the required depth, side by side, the full length of the traversing bar, leaving a dividing wall or partition one-half to three-quarters of an inch thick between each hole. The rotation pawls of the drill are then released, and the machine is then ready to break down the partitions by means of a broach, without rotating the piston. After this is completed, by loosening the rope the machine is let down another length of the bar, and so on until the bottom of the chamber is reached. There is then a continuous channel from the top to the bottom 2½ ins. wide, and of whatever reasonable depth is required. The machine is again taken to the top of the chamber, and three or four feet from the first channel a second one is put down the same size, and the slate between the two channels is then ready to be removed without blasting; consequently the slate is not wasted as in the old system. After the slate has been removed a free side is left 3 to 4 ft. wide by 5 to 6 ft. deep, as required, and the walls are left perfectly solid. When the slate in the chamber has all been removed to the depth of the channels, the machine is once more started, and repeats the previous work. There is no need for losing anything in the chambers by way of steps, as the machine works close to the wall, and can be made to carry the chamber larger at the bottom than at the top if necessary.

I have assumed that the bottom of the room or chamber has been channelled in the old style by blasting in a horizontal cut to the depth of 10 ft. or more and 3 or 4 ft. wide. This system is, however, like the former, quite as disastrous to the slate. So wide a channel is not required to remove the slate, but it has to be carried that width to allow the men room to work. Working with the machine, a channel 2½ inches wide is sufficient and can be put in by the same machine that does the sides, and which will put in either vertical or horizontal cuts. However, I would not recommend this, as the Ingersoll-Sergeant Drill Company construct a machine for *horizontal* cuts *only*, which is more adapted for the latter work, being quicker in operation and able to do the width of the chamber at one fixing. As a "channeller" it varies a little from the "broacher." It does not put in a series of holes, and broach down the partition between them, but makes a continuous channel, moving in the direction of the cut while striking, the movement being automatic, and instead of running on a bar it moves upon a track. Concluding, I may mention that the Ingersoll-Sergeant Drill Company will undertake to furnish the above machines on trial to parties desiring to experiment on their use.

W. M. TREGLOWN, Junior,
Of the Ingersoll-Sergeant Drill Company.

APPENDIX II.

STATISTICS concerning the DEATH-RATES from DISEASES and ACCIDENTS in the FESTINIOG DISTRICT, and SIZE of the SLATE MILLS; by RICHARD JONES, M.D. (Edin.), D.P.H. (Camb.).

MEAN AGE at DEATH of those EMPLOYED at the FESTINIOG SLATE QUARRIES.

TABLE I.—INCLUDING DEATHS from ACCIDENTS.

Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Mean of 10 Years.
*Quarriers	46	51	51	47·2	41·2	50	43·7	64·7	43·5	41·2	47·9
Rockmen (*i.e.*, slate-getters) and miners	41	50·6	50	45	56	43·8	42·2	59·4	54·7	38·6	48·1
Labourers	58	48·8	53·6	44·9	65·8	47·2	57·3	49·9	58·2	59·3	54·3
Engine-drivers, platelayers, weighers, &c.	52·6	71·3	61	63·5	58	67	46·6	77	40	66	60·3
Mean in each year for all classes	49·4	55·4	53·9	50	55·2	52	47·4	62·7	49·1	51·2	52·6

TABLE II.—EXCLUDING DEATHS from ACCIDENTS.

Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Mean of 10 Years.
*Quarriers	45·3	54·4	51	47·5	43·9	54·4	43·7	64	43	41	48·8
Rockmen (*i.e.*, slate-getters) and miners	39·3	56·7	51·5	48	56	45	43·4	59·4	56·6	37·9	49·3
Labourers	63	60	54·7	48	66	49·7	62·7	53·2	63·4	59	57·9
Others	52·6	71·3	61	63·5	58	67	46·6	77	40	66	60·3
Mean in each year for all classes	50	60·6	54·5	51·7	55·9	54	49·1	63·4	50·7	50·9	54

TABLE III.—DEATHS from ACCIDENTS in all CLASSES.

Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Mean of 10 Years.
Mean for all classes of workmen	45	37	39	38·7	45	36·7	35	46·8	34·4	36·6	39·4

TABLE IV.—SUMMARY.

Class of Workmen.	Quarriers.	Rockmen and Miners.	Labourers.	Others.	Mean of all Classes.
Mean age at death for 10 years including accidents	47·9	48·1	54·3	60·3	52·6
Mean excluding accidents	48·8	49·3	57·9	60·3	54
No. of deaths in 10 years	182	136	130	25	47·3
†No. of accidents in 10 years	17	24	22	„	6·3
Proportion of accidents to deaths	1 in 10 (about)	1 in 5 (about)	1 in 6 (about)	„	1 in 7 (about)
Mean age at death, accidents only	40·7	40·6	36·9	„	39·4

* For definition of the term "quarrier," see reply to Questions 7, 8, and 9, p. 1.
† The number of accidents is about equal for the first and last five years.

TABLE V.—DEATHS including those from DISEASES of the RESPIRATORY ORGANS.

Year.	No. of Deaths from all Causes.	No. of Deaths from Diseases of the Respiratory Organs.	No. of Deaths from Pneumonia only.	Per-centage of Deaths from Diseases of the Respiratory Organs, out of all Deaths.	Per-centage of Deaths from Pneumonia out of Deaths from all Causes.	Per-centage of Deaths from Pneumonia out of those of the Respiratory Organs.	Death-rate per 1,000 from Diseases of the Respiratory Organs.	Death-rate per 1,000 from Pneumonia.	Death-rate per 1,000 taking Population at 11,500.
1880 - -	200	83	29	41·5	14·5	34·94	7·2	2·5	17·3
1881 - -	140	45	12	32·14	8·57	26·66	3·9	1·04	12·1
1882 - -	170	73	22	43·	13·	30·1	6·4	1·9	14·7
1883 -	201	70	24	34·8	11·9	34·3	6·08	2·08	17·4
1884 - -	199	55	23	27·63	11·5	41·	4·78	2·	6·4
1885 - -	152	51	18	33·5	11·8	35·3	4·4	1·5	13·2
1886 -	176	52	13	30·	7·4	25·	4·52	1·1	15·3
1887 - -	184	68	26	37·	14·1	38·24	5·9	2·2	16·
1888 - -	172	61	24	35·4	13·9	39·3	5·3	2·08	15·
1889 - -	189	60	33	31·7	17·4	55·	5·2	2·8	16·4
Average for 10 years -	178·3	61·8	22·4	34·66	12·56	36·4	5·35	1·92	15·38

1. Population of Festiniog Urban District in 1881 - - - 11,274.
2. " " " 1891 - - - 11,078.
3. There was a great increase in 1882-3-4, and sudden decrease in 1889-90.
4. Average for 10 years taken at 11,500.

TABLE VI.

—	London. 1871–80.	England and Wales. 1871–80.	Festiniog Urban District. 1880–89.
Annual death-rate for 10 years from diseases of the respiratory organs.	4·6 per 1,000 population.	3·76 per 1,000 population.	5·35 per 1,000 population.

1. Those certified as quarriers are not exclusively confined to slate workers.

2. Rockmen and miners are grouped together as the conditions under which they work are similar or nearly so.

3. These tables do not give the mean age at death of the working quarrymen, as some have left the quarries (due to old age) before death, though still included as quarrymen.

4. Where the population of a district is stationary, the mean age at death is high, as the proportion of old people to the total population is large.

5. The figures were taken from the registers kept by Thomas Roberts, Esq., solicitor, Portmadoc, and by Mr. Daniel Humphreys, the registrar of births and deaths for the Festiniog Urban District—Trawsfynydd, Penrhyn, and Maentwrog; and do not include quarrymen living at Dolwyddelen, Bettws-y-Coed, Llanrwst and districts; nor those at Portmadoc, Criccieth, Harlech. Those not included form but a small minority of those employed in the Festiniog Slate Quarries.

6. They include all deaths of quarrymen within the districts mentioned in No. 5.

7. Mean age at death of persons killed by accidents 39·4 years, the youngest killed being 16 years of age. Boys enter the quarries at the average age of 14 years.

FESTINIOG REGISTRATION DISTRICT.

TABLE VII.—MEAN AGE at DEATH of the MALE INHABITANTS (over 14 years of age) NOT EMPLOYED in SLATE QUARRIES.

Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Mean of 10 years.
Farmers - - -	75·1	68·6	57·7	63·4	72·6	66·2	61·3	58·38	69·1	68·3	66·68
Merchants, grocers, drapers, tailors, weavers, gentlemen, professional men, clerks, accountants, insurance agents, travellers, &c., &c.	53·5	51·	47·17	57·	59·1	48·7	59·	50·88	51·85	57·5	53·57
Masons, joiners, shoemakers, bakers, slaters, butchers, sadlers, plasterers, blacksmiths, sett-makers, nailers, carriers, stonecutters, &c. &c.	63·1	42·3	55·2	54·7	67·	62·6	68·1	72·1	53·6	61·6	60·
Agricultural and general labourers.	44·5	54·5	59·5	70·	60·3	56·3	54·3	59·8	64·6	50·8	57·6
Mean in each year for all classes.	59·	54·1	54·89	61·2	64·7	58·2	60·6	60·29	59·7	59·5	59·46

TABLE VIII.—DEATHS from PHTHISIS amongst those EMPLOYED in SLATE QUARRIES.

Class of Workmen.	No. of Deaths from all Causes. 1883–92.	No. of Deaths from Phthisis. 1883–92.	Phthisis. Mean age at Death.	No. of Deaths from Phthisis out 1,000 Deaths from all Causes.
Quarriers	182	43	34·6	236
Rockmen and miners	136	19	44·5	140
Labourers	130	10	30·16	77
Others (see Table I.)	25	1	47	40
Total	473	73	39·06 (mean)	154 per 1,000

TABLE IX.—DEATHS from PHTHISIS amongst those NOT EMPLOYED in SLATE QUARRIES.

Inhabitants (Male, over 14 years) in Four Classes.	No. of Deaths from all Causes. 1883–92.	No. of Deaths from Phthisis. 1883–92.	Phthisis; Mean Age at Death.	No. of Deaths from Phthisis out of 1,000 Deaths from all Causes.
Farmers	87	6	40	70
Merchants, grocers, drapers, tailors, weavers, gentlemen, professional men, clerks, accountants, insurance agents, travellers, &c., &c.	83	19	34	230
Masons, joiners, shoemakers, bakers, slaters, butchers, saddlers, plasterers, blacksmiths, sett-makers, nailers, carriers, stonecutters, &c., &c.	77	17	40·4	220
Agricultural and general labourers	53	10	28·1	190
Total	300	52	35·6 (mean)	173 per 1,000

FESTINIOG REGISTRATION DISTRICT.

TABLE X.—DEATHS amongst FEMALES over 14 Years of Age, 1883–92.

Years.	Number of Deaths from all Causes.	Mean Age at Death (all Causes.)	Number of Deaths from Phthisis.	Mean Age at Death, (Phthisis.)	Number of Deaths from Phthisis out of 1,000 Deaths from all Causes.
1883	57	48·		31	87·7
1884	72	50·7		32	347·2
1885	71	55·3		41	183·1
1886	70	53·3		27·5	185·7
1887	65	48·7	14	28·2	215·3
1888	77	47·7	24	26·6	311·6
1889	83	53·		33·6	192·7
1890	73	48·6	18	30·9	246·5
1891	76	53·4	15	29·2	197·3
1892	76	56·1	11	34·7	144·7
Total	720	51·48	154	31·47	213·8

SUMMARY.

Females over 14 years of age	720	51·48	154	31·47	213·8
Quarrymen over 14 years of age.	473	52·	73	39·06	154
		54· (excluding accidents.)			161·7
Non-quarrymen over 14 years of age.	300	59·46	52	35·6	173

	1. Mean age of those dying from phthisis employed in Festiniog Slate Quarries	=39·06 years.
	2. „ „ „ *not* employed in Festiniog Slate Quarries	=35·6 „
	3. Amongst Festiniog quarrymen, out of 1,000 deaths from all causes, number due to phthisis (Table VIII.)	=154
Outside Quarries.	4. Amongst adult males (*see* Table IX.), out of 1,000 deaths from all causes, number due to phthisis	=173
	5. Amongst females (*see* Table X.), out of 1,000 deaths from all causes, number due to phthisis	=213
	*6. England and Wales, out of 1,000 deaths (all males), number due to phthisis	=220
	*7. Cornish miners, out of 1,000 deaths (all males, 25 to 65), number due to phthisis	=375
	*8. Printers, out of 1,000 deaths (all males, 25 to 65), number due to phthisis	=429
C. Lombard.	9. Workers exposed to mineral and vegetable emanations, out of 1,000 deaths, number due to phthisis	=176
„	10. Workers exposed to various dusts, out of 1,000 deaths, number due to phthisis	=145
Dr. Ogle.	*11. Stone and Slate quarriers (25 to 65), out of 1,000 deaths, number due to phthisis	=274

* These are all based upon Dr. Ogle's Comparative Mortality figures.

TABLE XI.—ACCIDENTS in the OAKELEY QUARRIES treated at the OAKELEY HOSPITAL, 1873–1882.

Year.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	Total of 10 Years.
Sprains, bruises, contusions, &c.	9	6	9	6	7	2	2	5	5	8	59
Head injuries	7	2	5	3	5	4	3	3	1	6	39
Fractures and dislocations	5	10	3	5	6	7	4	6	5	13	64
Injuries due to blasting	3	—	1	2	3	3	2	3	2	2	21
Internal injuries	2	2	3	1	3	3	1	1	2	5	23
Total	26	20	21	17	24	19	12	18	15	34	206

TABLE XII.—1883–1892.

Year.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	Total of. 10 Years
Sprains, bruises, contusions, &c.	4	4	2	9	6	9	6	8	8	6	62
Head injuries	4	3	4	2	3	4	3	4	1	1	29
Fractures and dislocations	8	5	7	5	2	2	5	3	4	6	47
Injuries due to blasting	2	2	3	1	—	2	1	2	2	3	18
Internal injuries	1	1	2	2	3	7*	1	4	—	1	22
Total	19	15	18	19	14	24	16	21	15	17	178

* Bridge accident, five men killed.

TABLE XIII.—FESTINIOG SLATE MILLS. CUBIC SPACE per MAN and BOY.

Name of Quarry.	Length (in Feet).	Breadth (in Feet).	Average Height (in Feet).	No. of Sawing Tables in each Mill.	No. of Dressing Machines in each Mill.	No. of Doors and other Openings in each Mill.	No. of Men and Boys employed in each Mill.	Cubic Capacity of each Mill in Cubic Feet.	Deductions, Sawing Table 125 Cubic Feet. Dresser 25 Cubic Feet. Blocks, Slates, Machinery, &c. = 50 Cubic Feet per Man.	Actual Cubic Space.	Cubic Space (in Cubic Feet) per Man and Boy employed in each Mill.
Graigddu, No. 1 mill	47	37	21	3	3	4	9	36,519	900	35,619	3,957
„ No. 2 „	60	72	19	8	8	8	18	82,080	2,100	79,980	4,443
„ No. 3 „	168	45	22	9	9	6	25	166,320	2,600	163,720	6,548
„ No. 4 „	96	45	17	6	6	3	15	63,440	1,650	61,790	4,119
„ No. 5 „	70	40	21	4	4	2	12	58,800	1,200	57,600	4,800
Rhosydd, No. 1 „	101	31	15	6	6	4	12	46,965	1,500	45,465	3,788
„ No. 2 „	143	37	15	10	10	10	20	79,365	2,450	76,915	3,845
Maenofferen, No. 1 mill	217	53	15	23	23	9	46	172,515	5,750	166,765	3,625
„ No. 2 „	212	61	15	26	26	14	52	193,980	6,500	187,480	3,605
Llechwedd, No. 1 mill	270	5	17	20	20	23	50	229,500	5,500	224,000	4,480
Wrysgan, No. 1 mill	152	56	15	11	11	9	22	78,144	2,750	75,394	3,427
No. 2 „	152	43	15	9	9	7	18	78,432	2,250	76,182	4,232
Oakeley, Middle	424	64	29	29	29	65	86	786,944	8,650	778,294	9,049
„ vertical shaft	385	50	24·5	24	26	44	65	471,625	6,850	464,775	7,150
Votty and Bowydd, lower	390	63	18	27	27	24	75	408,240	7,800	400,440	5,339
„ „ middle	180	63	18	23	23	28	62	204,120	6,550	197,570	3,186
New Welsh Slate, lower	123	56	19	8	8	19	17	130,872	2,050	128,822	7,577
„ „ lake	314	43	19	22	22	28	35	256,538	5,150	251,388	7,182

1. Average number of men employed with each pair of sawing table and dressing machine - = 2
2. Number of mills reported on, from figures supplied by the quarry managers - - - = 18
3. Mean average cubic space per man and boy in all the mills reported on - - - - = 5,019 cubic feet (5,019).
4. Amount of fresh air required per hour by healthy man doing hard work - - - - = 9,000 „
5. Amount of cubic space under the Factory Act (held as a rule) = not less than - - - = 250 „
6. „ „ „ „ working overtime - - = 400

TABLE XIV.—COMPARATIVE MORTALITY.

Years.	Deaths from all Causes. 25-65.	Deaths from Phthisis. 25-65.	Other Diseases of the Respiratory Organs. 25-65.	Deaths from Rheumatism and Heart Disease (Circulatory System). 25-65	Diseases of the Digestive System (including Liver). 25-65.	Diseases of the Nervous System. 25-65.	Deaths from Pneumonia (only). 25-65.	Number of Men killed. 25-65.	Diseases of the Liver. 25-65.	Diseases of the Heart. 25-65.	Deaths from all Other Diseases. 25-65.
1883	23	4	8	2	2	2	6	4	2	1	2
1884	27	2	4	5	3	3	3	10	1	2	2
1885	32	8	10	1	3	1	8	7	1	1	3
1886	25	5	3	2	6	2	2	6	1	2	1
1887	16	7	6	2	—	—	5	1	—	2	2
1888	30	6	5	3	3	2	4	9	2	1	3
1889	35	5	8	6	2	3	7	6	1	6	4
1890	21	4	7	—	2	3	3	2	1	—	3
1891	36	7	10	2	4	3	6	4	—	—	2
1892	30	5	7	4	5	1	6	4	1	3	2
Total	275	53	68	27	30	20	50	53	10	18	24

TABLE XV.—COMPARATIVE MORTALITY FIGURES.

Occupation.	Phthisis.	Other Diseases of the Respiratory Organs.	Killed by Accident.	Pneumonia.	Nervous System.	Digestive System (including Liver).	Liver.	Digestive System (excluding Liver).	Cancer.	Circulatory System and Rheumatism.	Rheumatism.	Urinary System.	All other Diseases.	All Causes. Comparative Mortality Figure.
All males (England and Wales). 25 to 65.	220	182 (402)	67	—	119	77	39	38	—	120	—	41	146	1,000
Stone and Slate Quarriers (Ogle). 25 to 65.	308	274 (582)	148	—	83	63	25	38	—	91	—	24	115	1,122
Festiniog slate quarriers. 25 to 65.	204	298 (502)	204	193	77	116	38	77	61	70	34 (104)	15	92	1,062
Festiniog non-quarriers (males). 25 to 65.	269	184 (453)	—	105	52	111	39	72	—	118	13 (131)	65	—	1,000 (taken at)

TABLE XVI.—SUMMARY OF METEOROLOGICAL READINGS.

Time.	Rainfall.	Barometer.	Thermometer (Indoor).	Thermometer (Outdoor).	Wind from N., N.E., and E.
	in.				
1888, May - -	2·66	29·255	51·45	44·8	10 days
„ June - -	4·32	29·209	57·53	53·8	12 „
1889, May - -	3·22	29·06	54·32	52·2	6 „
„ June - -	·89	**29·335**	**59·17**	**56·9**	**17** „
1890, May - -	3·56	29·09	55·06	59·8	12 „
„ June - -	12·63	29·239	56·3	55·5	4 „

These figures were taken from the meteorological records kept by E. Parry Jones, Esq., Cefnfaes, Blaenau Festiniog, now of Blaenddol, Festiniog.

APPENDIX III.

OCCUPATIONS of MALES and FEMALES aged 10 years and upwards in the COUNTY of MERIONETH.

[Taken from the Census of England and Wales (53 and 54 Vict. c. 61.), 1891.]

	Occupations.	Males.	Females.
1	The General or Local Government of the country	217	36
2	The defence of the country	19	—
3	Professional Occupations (with immediate Subordinates)	955	477
4	Domestic Offices or Services	135	4,715
5	Commercial Occupations	319	11
6	Conveyance of Men, Goods, and Messages	1,150	9
7	Agriculture	6,881	605
8	Fishing	12	1
9	Manufacture &c. of Books, Prints, Maps	117	6
10	„ „ Machines and Implements	136	2
11	„ „ Houses, Furniture, and Decorations	1,159	5
12	„ „ Carriages and Harness	109	—
13	„ „ Ships and Boats	91	—
14	„ „ Chemicals and Compounds	50	2
15	„ „ Tobacco and Pipes	5	—
16	„ „ Food and Lodgings	811	671
17	„ „ Textile fabrics	453	92
18	„ „ Dress	633	1,082
19	„ „ Animal substances	105	1
20	„ „ Vegetable substances	100	12
21	„ „ Mineral substances	5,523	23
22	„ „ General or Unspecified Commodities	1,335	40
23	„ „ Refuse Matters	8	—
24	Unspecified Occupations	3,983	17,708
	Totals	24,306	25,498

APPENDIX IV.

RAINFALL in the FESTINIOG DISTRICT.

Month.	Station. Oakeley Mine, Altitude of Station, 1,100 feet.										Station. New Welsh Slate Mine, Altitude of Station, 1,060 feet.			
	Year 1890.		Year 1891.		Year 1892.		Year 1893.		Year 1894.		Year 1893.		Year 1894.	
	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.	No. of Rainy Days.	Rainfall in Inches.
January	Not kept.		14	7·80	15	9·39	17	4·44	24	8·84	Not kept.	Not kept.	23	9·64
February		1·52	5	·69	10	3·39	20	12·71	24	19·97			25	20·95
March		·72	12	4·11	11	2·41	8	3·16	15	10·22			15	10·91
April		4·02	11	5·26	11	3·74	4	·92	13	3·22	2	·40	18	3·45
May		4·35	16	4·57	18	7·79	10	5·75	16	6·86	12	6·40	19	8·21
June	24	11·29	13	4·74	15	5·47	13	5·64	21	6·53	12	5·90	22	8·58
July	18	9·89	12	8·30	13	7·45	18	5·78	19	8·18	17	6·53	21	7·88
August	17	6·27	18	18·50	18	14·04	14	10·30	23	8·18	22	11·78	27	10·04
September	13	5·60	19	12·59	22	12·56	18	9·71	6	1·18	24	11·03	8	0·93
October	17	7·80	21	10·53	25	9·17	17	10·60	18	9·30	24	13·90	23	10·10
November	22	17·41	20	7·69	20	8·40	15	9·62	22	12·05	22	13·74	25	13·65
December	4	1·07	21	17·89	16	8·94	28	10·83			29	13·24		
Totals			182	102·67	194	92·75	182	89·46						

APPENDIX V.

List of Merionethshire Slate Mines.

Number on the Map.	Name of Mine. *Italics* denote Mines suspended during the whole of 1893, but not abandoned.	Situation. The figure denotes the Distance of the Mine in Miles from the Town or Village after which it is placed.	Approximate Altitude in Feet above the Sea Level.			Persons ordinarily employed during the Year 1893.		Quantity of Dressed Slate and Slabs produced.
			Highest Entrance into the Mine.	Lowest Entrance into the Mine.	Main Office.	Below Ground.	Above Ground.	Statute Tons.
1	Abercorris - -	Corris, 2 - -	1,070	985	770	14	21	3,884
2	Aberllefenny -	Aberllefenny, Corris, 2.	725	390	360	73	59	444
3	Braichgoch (including Gaewern).	Corris, ½ - -	589	390	390	58	90	6,044
4	Bryneglwys and Cantrybedd.	Abergynolwyn, Towyn, 8.	1,063	680	853	97	88	6,335
5	Bwlch-y-Slater	Blaenau Festiniog, 4 -	1,680	1,620	1,700	5	11	270
6	*Conglog* - -	Tan-y-grisiau, Blaenau Festiniog, 4.	1,425	1,195	1,125	—	—	—
7	Crown - -	Dolgelly, 3 - -	875	815	835	3	—	4
8	Cymerau - -	Corris, 3½ - -	615	545	615	11	10	530
9	Diphwys Casson -	Blaenau Festiniog, 2 -	1,635	985	900	57	29	1,136
10	*Fronboeth and Pantmawr.*	Portmadoc, 6⅓; Tan-y-grisiau, 2⅔.	1,505	1,360	1,360	—	1	—
11	*Henddol* - -	Barmouth, 3.	290	140	80	—	1	—
12	Llechwedd - -	Blaenau Festiniog, 1 -	1,070	780	840	222	264	15,615
13	Maen Offeren -	Ditto, 1 - -	1,320	1,035	1,112	167	161	11,047
14	Manod Mawr -	Festiniog, 2 - -	1,125	1,125	—	2	—	—
15	Minllyn (formerly Carlyle).	Dinas Mawddwy, 1 -	835	835	300	12	8	550
16	Moelferna - -	Glyndyfrdwy, 3 -	1,620	1,530	710	40	84	4,955
17	Moelwyn - -	Tan-y-grisiau, 1½ -	1,600	1,600	1,315	4	—	76
18	New Welsh Slate (formerly Cwmorthin).	Tan-y-grisiau, Blaenau Festiniog, 3.	1,245	1,095	1,105	183	108	6,910
19	Oakeley - -	Blaenau Festiniog, 1 -	1,465	790	1,110	736	916	56,589
20	Park - -	Llanfrothen, Portmadoc, 5.	170	170	170	14	15	409
21	*Penarth* - -	Corwen, 2 - -	1,106	1,068	1,068	—	—	—
22	Ratgoed - -	Corris, 4 - - -	1,048	1,048	615	7	5	232
23	Rhosydd - -	Tan-y-grisiau, Blaenau Festiniog, 4.	1,725	1,495	1,485	108	78	4,962
24	*Voelgron* - -	Festiniog, 3½ - -	1,460	1,460	1,340	—	—	—
25	Votty and Bowydd -	Blaenau Festiniog, 1 -	885	840	830	251	212	14,537
26	Wrysgan - -	Tan-y-grisiau, Blaenau Festiniog, 2⅔.	1,385	1,320	1,385	41	55	3,006
						2,105	2,216	137,535

APPENDIX VI.

Ages of the Workmen employed at the New Welsh Slate Mine in January 1893.

Total number of men and boys employed - - - - -	286
Average age of these 286 persons - - - - - -	34·4 years.
Number employed under 18 years of age - - - - -	26
Average age of the remaining 260 persons above 18 - - -	36·2 years.
Number employed under 16 years of age - - - - -	7
Average age of the remaining 279 persons above 16 - - -	34·9 years.
Number of slatemakers [*quarrymen*] employed - - - -	78
Average age of these 78 persons - - - - - -	28·7 years
Number of slatemakers under 16 years of age - - - -	6
Average age of the remaining 72 slatemakers above 16 - - -	29·9 years.
Age of the oldest of these 72 slatemakers - - - - -	73 years.
Number of these 72 slatemakers above 40 years of age - - -	13

APPENDIX VII.

List of Fatal Accidents at Slate Mines in Merionethshire from 1875 to 1893.

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				Falls of Ground.			
1875	Mar. 19	1	Rhiwbryfdir	John Jones	Slate miner	—	A fall of stones upon him in his working place.
„	Oct. 15	8	Aberllefenny	William Davies John Davies	„ „	52 24	These men were engaged raising slate on a slope near the edge of an underground shaft by which the slate was lowered from their workings to a level 30 yards below them. While they were thus employed the rock on which they stood suddenly slid down into the shaft, carrying them with it to the bottom. The ground had parted at an oblique joint, of which I was assured there were no indications before the accident occurred.
1876	Feb. 5	11	Palmerston	Evan Roberts	Labourer	48	The falling of a piece of stone upon his foot from a "clay slant" about three feet high. The accident caused serious injury to his foot, which it was found necessary to amputate. He appeared to have recovered from the effects of the accident, but became debilitated, and died in about a fortnight.
„	Mar. 23	12	Cwmorthin	Llewelyn Lloyd	Slate labourer	38	The deceased was engaged loading a waggon in one of the "bargains" of the mine, and it is supposed that while doing so a lump of stone fell from the roof upon his head and killed him. He was alone at the time, and never spoke after being found; but the nature of his injury and the appearance of a stone lying near him led to the conclusion that he met with his death in the manner suggested.
„	„	13	Aberllefenny	Robert Williams	Slate miner	37	A piece of rock fell from the roof of the chamber in which the deceased was working, and gave him a blow on the head which proved fatal. His partner who was standing by at the time could give no explanation as to the cause of the fall.
1877	April 22	18	Votty and Bowydd	Hugh Edwards	Miner	19	In this case no inquest was held, the man having been buried under a doctor's certificate before the coroner and inspector could by any possibility arrive at the place.
„	June 8	20	Holland	William Griffith	Slate miner	34	The deceased and another man had fired a blasting charge, and went to the place soon after doing so to ascertain the amount of work it had done, when a rock of several tons' weight came down upon them, causing the instantaneous death of one, and severe injuries to the other.
„	Aug. 25	24	„	Simon Jones	„	55	The falling upon him of a stone from the roof of the level which he was driving.
„	Dec. 7	29	Bryneglwys	David Evans Hugh Jones	„ „	38 27	Unexpected fall of rock from another "bargain."
1878	May 2	34	Braichgoch	Edward Evans	„	55	He was injured by a stone which fell upon him from the roof of his working place, and he died from the effects of the injury six days afterwards.
1880	May 3	44	„	John Jones	Rockman	41	Unexpected fall of slate from the face of the rock where he was working, which broke the ladder upon which he and his comrade were standing. The latter was laid up for six weeks.
„	June 22	46	Cwmorthin	Morris Pritchard	Miner	36	Unexpected fall of part of roof of a chamber, he was working in the level.
„	Oct. 18	51	„	Morris Evans	„	36	Fall of roof, which he knew to be weak, and which he intended to take down later in the day.
1881	April 22	53	Oakeley Middle	Edward Jones	Rockman	42	He fired a hole in the face of his bargain, which loosened a large block of slate. His partner told him he thought it was sufficiently loose to be got down with a crowbar, but Jones considered more powder was necessary, and was on his way down to fetch some, when the block fell and rolled on to him.
„	June 17	54	Diphwys Casson	Edward Hughes	Miner	41	He was engaged in widening a "roof," and he left a large slab about 18 inches thick just under the "hard," which he was bound to take away sooner or later. In spite of warnings from his comrades, one of whom refused to go to the place while the dangerous piece of roof was left, he delayed taking the slab down. At last he was ordered to take it down by the agent, and while engaged in this operation, the piece fell and killed him. There was not necessarily any danger in taking it down.
„	June 28	55	Cwmorthin	William Williams	Miner	55	Williams and his partner were widening a "roof," and had followed a well marked "slant." They appear to have blasted a hole which loosened a slab 18 inches in thickness, between their slant and the next, and this came down upon them. The partner was badly injured.
„	Aug. 9	56	Abercwmeiddaw	David Thomas	Rockman	23	He had blasted a hole which threw down the block of slate required, and he then put his ladder against the face and went up to see if any loose stuff was left which required to be taken down. Before he reached the top of the ladder some pieces fell and inflicted fatal injuries.
1882	Feb. 21	64	Palmerston	Hugh Jones	Miner	39	Unexpected fall of roof, which was considered so firm that he and his partner had arranged to bring it down by blasting.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				FALLS OF GROUND—*continued.*			
1882	Mar. 3	65	Wrysgan	William Roberts	Rockman	35	About 15 or 20 tons slipped away from the face of the bargain unexpectedly, although the men had examined the place and pronounced it safe.
„	July 25	66	Oakeley Upper	Robert Roberts	Rockman	30	Unexpected fall of a block of slate from the face of his bargain.
„	Aug. 3	67	Palmerston	Robert Jones	Labourer	49	Unexpected fall of slate from the top of a pillar more than 100 feet above him.
„	Dec. 21	68	Maen Offeren	Samuel Morris	Miner	19	Fall of a large slab of the "9-inch" bed, while he was in the act of taking it down.
1883	May 10	72	Oakeley Middle	John Griffith	Rockman	38	A block of slate which he thought safe slipped on him.
1884	April 2	77	Rhosydd	Richard Williams	Miner	45	While engaged in removing some roof, known to be weak, a larger piece fell than he expected, and he was struck down by it and killed.
„	April 8	78	Braichgoch	Hugh Edwards William Andrew	Slate Sawyer Labourer	44 40	While they were endeavouring to raise a tram of rubbish, which had got off the rails, a stone fell from the roof 20 feet above them, or from some adjacent workings, and killed them on the spot.
„	May 15	79	„	Griffith Tibbot	Rockman	60	Unexpected fall of a huge block of slate, while he and another man were preparing holes for the purpose of throwing it down by blasting.
„	June 26	80	Cwmorthin	David Lewis	Miner	28	He was using a bar to remove some loose dangerous roof, standing underneath it instead of at a higher level, as advised by the manager 20 minutes before the accident. A large stone fell upon him and inflicted fatal injuries.
„	June 30	81	Oakeley Upper	William Jones	Labourer	34	Unexpected fall of rock from the side of a pillar on one side of the chamber in which he was working.
„	Nov. 21	82	Cwmorthin	John Morris	Rockman	35	Unexpected fall of slate from the face of bargain. He and his partner had examined the place several times, and thought that it was safe; but a large block of slate slipped away from a concealed joint and struck him in its fall. He died 16 days after the accident.
1885	Jan. 29	89	Oakeley Upper	John Williams	Rockman	26	While he was splitting a block of slate he was struck by a stone, which fell either from the roof or side of his chamber, and his right leg was broken. He was in a very unhealthy state before the accident and died eight days afterwards.
„	Mar. 18	90	Votty and Bowydd	Richard Thomas	Miner	43	He was standing on a ledge of rock which he knew to be insecure; it gave way, and he fell nine yards, receiving fatal injuries.
„	Mar. 19	91	Oakeley Upper	Thomas Roberts	Rockman	65	Unexpected fall of a piece of slate rock from the face of the bargain where his son was at work.
„	May 1	92	Maen Offeren	John Jones	Labourer	32	Unexpected fall of some stones, weighing about 2 cwt., from the roof of the chamber, 50 feet above them.
„	June 3	93	Braichgoch	Edward Morgan	Rockman	33	Premature fall of a block of slate, weighing about 20 tons, which was known to be loose, but which was not expected to fall until a blast had been fired. The hole had been bored, but the block fell before it was charged.
„	Aug. 28	94	Cwmorthin	John Hughes	„	42	Unexpected fall of rock from the roof of the chamber 45 feet above him.
1886	April 2	97	Maen Offeren	Richard Roberts	„	36	Unexpected fall of rock from the side of a pillar where he had just been blasting.
„	Nov. 4	98	Rhosydd	Robert Jones	„	26	Unexpected fall of rock from a pillar, the side of the chamber in which he was working. The men thought the place safe, as they had sounded it a few days before the accident.
1887	Sept. 19	105	Bryneglwys	John Lewis	Miner	30	A block of slate fell against him unexpectedly from the side of a narrow cutting he was making.
„	Sept. 21	106	Oakeley	John Roberts	Rockman	20	Fall of a lump of slate from the side of a pillar, which other men were making safe. Roberts and Edwards ventured into the chamber in spite of warning not to do so.
„	Dec. 5	107	Llechwedd	John Jones	„	58	Blow on the head from a small stone which dropped from the roof of the chamber, more than 100 feet above him.
1888	May 2	110	Bryneglwys	David Roberts	Miner	52	Unexpected fall of a stone, weighing 30 lbs., from the roof of his working place, 12 feet above him. His partner said that they had not sounded the roof during the three months they had been working at the place, though they could have done so easily without any scaffolding.
„	June 2	111	Aberllefenny	John J. Williams	Rockman	20	Unexpected fall of rock from about 30 feet above him while walking along a regular travelling road.
„	June 8	112	Cwmorthin	Allen Griffiths	Miner	52	Unexpected fall of a piece of a large rock which he was endeavouring to break up by blasting. The piece fell from a place quite within his reach.
„	Aug. 28	113	Oakeley	Humphrey Roberts	Rockman	30	Unexpected fall of ¾ to 1 ton of rock from the roof of the chamber 60 feet above him. The roof had been left as safe when first formed 10 years before.
1889	April 5	117	Votty and Bowydd	Robert Thomas	Labourer	34	Unexpected fall of a part of the roof of the large underground chamber in which he was working; about two tons of rock fell at a little distance from the deceased, struck the working face and rebounded into the chamber. The deceased was found directly afterwards with his skull fractured. It is probable that this death was caused by his being struck by one of the fragments; but it was also suggested that in rushing away on hearing the fall, he struck his head with sufficient violence to fracture the skull. The roof had been carefully examined and sounded eight days before the accident.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				FALLS OF GROUND—*continued.*			
1889	Aug. 13	118	Bryneglwys	Richard Davies	Rockman	43	Fall of a slate from the side of his working place which he considered to be safe.
„	Oct. 18	119	Llechwedd	Robert Ellis	Miner	32	Unexpected fall of a slab of rock, known as the 9-inch band, from the roof of his working place, which was only about 4 feet high. Some dangerous pieces of 9-inch band had been taken down six days before the accident, but the part that fell was considered safe by the men and agents.
1890	Jan. 11	125	Oakeley	Richard William Roberts.	Rockman	65	Fall of a stone weighing about 15 lbs. from the working face of a slate chamber. A big block had been thrown down by a blast, and the deceased went back to the place after the lapse of only three or four minutes, instead of waiting awhile, as is customary, for fear all the rock should not have come down at once. While the deceased was looking at the block which had been thrown down, a small piece of rock, loosened by the blast came away and struck him on the back.
„	Feb. 14	126	„	Edward Mills	„	48	Precipitated to a depth of 36 feet by the giving way of the rock at the edge of a precipice upon which he was standing. He had blasted a hole near the rock which fell, and this no doubt shook it, and caused it to fall.
„	Feb. 19	127	Bryneglwys	David Evans	„	40	A huge block of slate, weighing about 25 tons, came away unexpectedly from the working face. The men had split off some of the foot of the big block, but they were of opinion that it would not come down without blasting.
„	June 18	128	Oakeley	William Kilner	Labourer	46	Unexpected fall of a piece of rock, weighing from half to three-quarters of a ton, from the side of the chamber in which he was working. The rock fell from a height of about 24 feet.
1891	Jan. 23	130	Park	Owen Williams	Rockman	36	Premature and unexpected fall of slate rock from the roof, which was only a few feet above them, and which had been sounded and pronounced safe a few days before.
„	April 28	131	Oakeley	John Roberts	Platelayer	55	A lump of slate, weighing about 50 lbs., fell unexpectedly from the side of a pillar from a height of 29 feet, and struck him on the shoulder. He died a few days afterwards.
1892	Feb. 5	135	New Welsh Slate	David Jones William Ellis	Rockman „	42 27	Fall of rock from the roof of the chamber in which they were working.
„	Mar. 15	136	Llechwedd	Evan Roberts	„	66	He was boring a hole in the working face of hi chamber, when some of the rock, 5 feet above him, slipped down and struck him.
„	April 6	137	Oakeley	Owen Griffith	„	22	Unexpected fall of two tons of rock from the side of a pillar about 45 feet above the place where he was at work.
„	Oct. 29	138	New Welsh Slate (Cwmorthin)	Josiah Roberts	Miner	30	Unexpected fall of the roof of his working place, an excavation 4 feet high, while he was "widening" as a preparation for a new chamber.
1889	Jan. 16	142	Braichgoch	David Edwards	Rockman	53	A block of slate slid down unexpectedly from the working face, and the man hearing the noise ran away; unfortunately he happened to go just where it was coming down, and he was struck by it and killed.
„	Sept. 8	145	Oakeley	John Jones	„	45	Fall of a big block of slate from the working face. He had fired a hole in order to bring down the block, but as it did not come away he at once climbed up, and he said he would re-charge the hole. At this moment the block fell and struck him. His partner had begged him to wait a bit as usual before going up the face.
„	Nov. 7	146	„	Owen Williams	„	42	Unexpected fall of a block of slate weighing about 2½ tons, from the side of the chamber in which they were working. The piece fell from a height of 53 feet, from a place far beyond the men's reach, which could not be minutely examined without rigging up ladders specially. The chamber had been inspected by the men and agents with the aid of the Wells light, about two months before the accident, and pronounced safe. His partner received injuries to the head and leg.
„	Nov. 14	147	Votty and Bowydd	Evan W. Roberts	„	62	Fall of a piece of slate, weighing about 4 cwt., which he was in the act of getting down. It caught his leg against a sharp stone, which severed the main artery in the calf, and though his comrades succeeded in stopping the bleeding within eight minutes after the accident, he died from the loss of blood and the shock in less than two hours.

IN SHAFTS.

Overwinding—None.

Ropes and chains breaking—None.

Whilst ascending or descending by machinery—None.

Falling into shaft from surface—None.

Things falling from surface—None.

Falling from part way down.

1892	June 24	139	Cymerau	Robert Morgan	Rockman	37	While working on a ledge in an underground chamber, he slipped and fell into the intermediate shaft, down which rubbish was thrown and slate lowered.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				Things falling from part way down—None.			
				Miscellaneous in shafts—None.			
				MISCELLANEOUS UNDERGROUND.			
				Explosions of Gunpowder, &c.			
1875	May 27	4	Rhiwbryfdir	Robert Owen	Slate miner	27	The explosion of a charge of powder.
1876	Aug. 15	15	"	Griffith Evans	" "	32	The explosion of a charge of powder while he was tamping it. The iron tamping bar which he was using at the time was driven almost through his head.
1877	July 30	23	Llechwedd	Robert Lloyd	" "	33	The explosion of a charge of powder while he was charging a hole a second time.
"	Oct. 13	28	Votty and Bowydd	Hugh Thomas	" "	20	A charge of gunpowder, which he was in the act of firing, exploded before he had time to retire to a place of safety.
1878	Jan. 2	32	Palmerston	David Jones	" "	59	Struck by a stone from a blast fired by other men; he had received warning of the blast, but being very lame did not retire quickly enough to reach a place of safety.
"	Oct. 21	37	Oakeley Upper	Humphrey Davies	" "	27	Explosion of a charge of gunpowder which had hung fire. He returned thinking that it had gone off.
1880	May 5	45	Oakeley Middle	Evan Jones	Rockman	25	Explosion of a second blast which hung fire for 10 minutes and was supposed to have missed fire. His comrade Lewis Jones was seriously injured.
"	Aug. 20	48	Llechwedd	Edward Rowlands	"	26	Sudden explosion of a charge of gunpowder while he was in the act of lighting the fuse.
"	Aug. 31	49	Penarth	Thomas Jones	"	44	Explosion of 4 lbs. of powder from letting a lighted candle fall upon it.
1883	June 14	73	Crown	Griffith W. Lewis	"	28	A hole charged with potentite had missed fire on the previous day; while Lewis was working with a pick on the rock close to it, the charge went off.
"	Oct. 2	74	Votty and Bowydd	Bennett Davies	Labourer	17	Struck on the forehead by a stone from a blast 30 yards away from him. He was sheltering himself behind a waggon.
1884	May 14	83	Palmerston	Joseph L. Jones	Miner	17	His partner was using an iron bar to tamp a hole charged with gunpowder and guncotton, when it exploded. The partner had his skull fractured.
1885	May 29	99	Diphwys Casson	Hugh John Jones	Slate maker	16	Explosion of 28 lbs. of gunpowder in a level. He was carrying two calico bags each containing 4 lbs. of powder, and struck a match to light a candle or a pipe. His powder ignited and set fire to five similar bags carried by other men, who were severely injured.
"	Sept. 28	100	Oakeley Upper	John Lewis	Miner	35	He and his partner were driving a level in opposite directions to meet each other, and on the day of the accident the barrier between them was only 3 or 4 feet across. His partner signalled by hammering that he was going to fire, and Lewis replied in the same way. The hole was fired, broke through the barrier and killed Lewis, who for some unaccountable reason had not retired.
1888	Feb. 22	114	Oakeley	Evans Roberts	Rockman	47	The accident was caused by a blast, but no more can be said with certainty. It is supposed that a charge of gunpowder and guncotton failed to go off completely, and that after hanging fire for an hour, the remnants exploded unexpectedly when Roberts returned to his working place.
1891	July 14	132	Aberllefenny	William Pritchard	Miner	35	Struck by a stone from a shot fired by another man. The shot took fire and went off prematurely while this man was preparing to ignite the fuse.
				Suffocation by gases—None.			
				Irruption of water—None.			
				Falling into water—None.			
				On inclined Planes.			
1885	Jan. 1	95	Palmerston	William Jones	Mason	61	He tried to jump on to the ascending carriage of a steep incline, missed it, and rolled down a distance of 30 yards, falling into water at the bottom. He dislocated his hip. He died of congestion of the lungs accelerated by the accident, on the 12th January.
1887	Dec. 29	108	Palmerston	Robert Williams	Trammer	18	A sled with a block of slate went off the rails in going up an incline. Williams was assisting to replace it when the pin of the shackle got loose, through loss of the cotterel, the sled became detached from the rope and slid down about a yard. Williams was struck by the block of slate and received fatal injuries. Jones had his hand hurt.
1889	Sept. 2	120	Oakeley	Benjamin Lewis	Hooker-on	24	While crossing an incline for the purpose of riding upon a loaded waggon to the next floor, in contravention of the Special Rules, he was struck by an empty sled which was coming down a parallel line of rails. He had been warned that the sled was coming down, but the top of the incline was so smoky that he did not see it.
1890	Mar. 5	129	Votty and Bowydd	Owen Jones Rees Jones William Jones	Hooker-on Labourer "	51 35 44	Struck by an empty truck on a pass-by at the foot of an incline; the truck was hooked on to the rope at the top of the incline, when the pin of the link of the coupling chain came out and the truck ran away down the incline. The pin came out owing to the absence or imperfection of the cotterel, which had not been noticed.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				On inclined Planes—continued.			
1891	Aug. 29	133	New Welsh Slate (Cwmorthin).	Samuel Evans	Labourer	18	He was riding up an incline on a loaded waggon, in disobedience to orders, and had his head struck by a projecting piece of rock in the roof.
1893	Mar. 11	143	Maen Offeren	John Evans	Miner	37	While the deceased was engaged in blasting away the floor of an incline at the side of the line of rails, a truck got loose, from the chain breaking and ran down violently. The deceased was struck by the truck or the load as it passed him.
				By Trams and Tubs.			
1878	July 12	35	Palmerston	John Davies	Labourer	24	Knocked over a small precipice by a truck of slate which was upset by a blow from another truck.
				By Machinery Underground.			
1875	June 12	6	Ratgoed	Rowland Owen	Slate miner	22	Struck on the head by the handle of a crab winch. It caused instantaneous death.
1877	Oct. 10	26	Holland's	Thomas Meredith Edward Rowland	Labourer „	29 25	These two men were thrown down with great violence from the place in which they were, to a floor 12 yards below them, through the sudden fracture of the vertical axle of a crane, the handles of which they were turning at the time.
1885	June 19	96	Cwmorthin	Robert Davies	„	25	Skull fractured by the handle of a crane while he was lowering a large block of slate. He had slackened his hold too soon, thinking that the block was down. He died nine days after the accident.
1886	Oct. 25	101	„	Griffith Williams	Rockman	52	While lowering a block of slate with a crane, he let the handle slip, it flew round and struck him on the forehead. One end of the block was already resting on the ground.
1888	Mar. 14	115	„	Edward Owen	Labourer	28	He was hauling a block of slate down a heap of rubbish by a winch and chain. The block suddenly started rolling, and gathering up the chain about it reversed the winch, the handle of which flew round and struck Owen on the forehead. A pawl would have prevented the accident.
1889	Aug. 26	121	Diphwys Casson	Owen Henry Roberts.	Rockman	30	He was at a winch lowering a block of slate, one end of which was resting on the ground, when he let go the handle. It flew round and struck him on the forehead. Probably he thought the block was resting quite firmly on the ground, and was holding the handle of the winch loosely, when the block gave a slight lurch, and so jerked the chain and caused the handle to revolve. He had received a severe injury in precisely the same manner in April 1886.
				Sundries Underground.			
1875	May 27	3	Cwmorthin	Evan Evans	Labourer	45	A fall over a precipice.
„	June 5	5	Welsh Slate	David Hughes	Slate miner	30	A fall over a precipice.
„	Sept. 16	7	Braichgoch	Robert Roberts	„	17	Falling from one floor (level) to another. He was following his father, with whom he was working, along a pathway to their working place, but having turned back a few paces to give another workman a light, he inadvertently stepped aside over a precipice which the footpath skirted.
1876	May 3	14	Cwmorthin	Owen Morris	Slate labourer	16	A fall of 50 yards over an underground precipice. The deceased was engaged tramming from a chamber to the mouth of a level. While so doing he had to pass along the edge of the precipice over which he fell, and which was entirely destitute of any protection in the shape of a fence or rail. It is supposed that he got confused on hearing suddenly the shout "Fire" given before firing a blast, and fell over while hastening to a place of safety. The coroner's jury very properly recommended that all such places should be made safe by a good rail so placed that men could not fall over.
1877	April 16	17	Bryneglwys	William Owen	Slate miner	37	The deceased and his partner in the bargain were beginning to bore a hole while standing upon a step of slate rock, when a small piece of slate slid away from the rock facing them, pushing the deceased backwards over the steps, and causing him a fall from 5 to 6 yards. The partner was slightly injured in the thumb by the falling slate, but said he did not think the deceased was injured by anything besides the fall.
„	June 4	19	Cwmorthin	Edward Williams	Carpenter	32	The deceased was employed upon a new bridge in the course of erection in a part of the underground workings, and fell from it a distance of about 14 yards. The cause of his falling could not be ascertained, as the men who were working near him did not witness the occurrence, and only missed him on leaving their work in the evening.
„	July 5	21	Cymerau	Thomas Davies	Slate miner	33	A fall down an underground precipice; he was returning to his work with a candle in his hand after the firing of a charge, and was supposed to have missed his way owing to the thickness of the powder smoke.
„	Sept. 20	25	Braichgoch	Owen Jones	„	38	Falling over the edge of the floor on which he was working to the floor below, a distance of from 10 to 12 fathoms.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				Sundries Underground—continued.			
1877	Oct. 15	27	Llechwedd	John Williams	Slate miner	38	He was leaving his work, and is supposed to have made a mistake as to the direction he should take, and to have walked over the precipice, at the bottom of which he was found.
„	Dec. 13	30	Braichgoch	John Williams	Labourer	11	This child fell over an underground precipice. He went into the mine, as stated in evidence, for the purpose of obtaining inferior slates for dressing, and fell from a truck upon which he was riding.
1878	Feb. 6	33	Cwmorthin	Hugh Ellis	Slate miner	22	The deceased having charged four holes for blasting, and fired three, went down by a chain to fire the fourth. While he was thus engaged the chain broke, and dropped him to the bottom, where he was found dead.
1879	June 4	38	Llechwedd	Wm. Williams	Miner	20	Struck by a piece of rock thrown down by a man working 15 or 18 yards above him, who had given warning.
„	Oct. 28	42	Palmerston	Richard Lewis	Slate miner	72	Fell from one floor to another while working in his bargain.
1880	Mar. 25	43	„	Samuel Jones	Rockman	57	Fell from an underground pathway into workings below.
„	Oct. 1	50	Braichgoch	Thomas Evans	„	29	Fall of a loose stone upon his head while removing a ladder which was standing up against a steep face of rock.
1881	May 31	57	Cwmorthin	Robert Jones	„	47	He fell from an unfenced bridge while going to his work.
„	June 4	58	Aberllefenny	Richard Pugh	Labourer	45	He fell 60 feet from an unfenced tram-road while proceeding to his working place.
„	July 26	59	Braichgoch	Evan Lewis	Rockman	25	He had been clearing away loose stuff from the top of his bargain, and was on his way out when he fell over the edge and was killed. There was no pathway or tram-road, and, consequently, no infringement of the special rules for not having the place fenced.
1881	Sept. 9	60	Palmerston	Owen Hughes	Labourer	29	He was working at the foot of a great pile of rubbish which had run into the chamber from falls at higher levels, and he was struck by a stone which may have rolled down the heap, or possibly have fallen from the roof or pillar.
1882	Dec. 26	69	„	David Roberts	Quarryman	28	He fell from a bridge, part of which was unfenced.
1883	Mar. 10	75	Oakeley Upper	Owen Roberts	Rockman	21	After setting light to a hole close to the bottom of his bargain he unnecessarily climbed up to the top, went into an old abandoned level about 40 feet long, in a pillar, and fell over a precipice.
„	Nov. 13	76	Votty and Bowydd	Thomas Roberts	Miner	76	He stumbled while running away to escape the fall of some slate in a place where he had just fired a blast, and falling on the road broke a rib. His health was already much impaired by disease, and he died four days after the accident.
1884	April 22	84	Cwmorthin	Owen Lewis	Miner and repairer	48	While in the act of shifting a balk of timber, with which he was constructing an underground bridge, he slipped and fell over a precipice.
„	Aug. 15	85	Palmerston	Thomas Morton	Miner	50	He was clearing rubbish from the great fall when a stone rolled down and struck him on the back.
1886	July 21	102	Cwmorthin	Owen Lewis	Labourer	27	While clearing the fall they were struck by a piece of rock which rolled down the slope.
1887	Feb. 23	109	Aberllefenny	Lewis Griffith	Rockman	54	Blow on the head from some rubbish tipped from the floor above. Griffith knew that the tipping was going on, but forgot to shout and stop the men as he passed.
1888	Feb. 16	116	Oakeley	Richard Edwards David Davies Evan Jones William Lloyd Owen Parry	Trammer „ „ „ „	48 29 26 19 31	In contravention of the rules of the mine, they trammed three loaded waggons on to a bridge, across which only one was allowed to pass at a time. The bridge broke, and they fell 60 feet and were killed.
1889	Sept. 9	122	„	John Roberts	Labourer	49	He got over a stone wall underground in order to relieve his bowels, and having done so, went away in the wrong direction, and fell over a precipice. Proper privies were available, and the man was disobeying orders by going where he did.
„	Sept. 30	123	Votty and Bowydd	Daniel Roberts	Miner	40	He got over a fence 3 feet high at the entrance of a disused level 45 feet long, through a pillar between two underground chambers, and fell over a precipice 50 feet deep at the other end of the level. It is probable that he went into this level to relieve his bowels, and possibly put out his candle for fear of being discovered in the act of breaking the rules. He had only just left the surface a few minutes before, and there was no necessity for his going where he did, for he was in perfect health and not suffering from diarrhœa.
1890	Dec. 22	134	Oakeley	John Davies	Rockman	58	He was standing where a level opened into a chamber partly filled with slate and rubbish from the collapse of workings above. He was loading a waggon at the foot of the heap of rubbish, when a large stone which was close to him rolled down sooner than was expected and struck him, breaking three ribs. He had been suffering from pleurisy and heart disease, and he died very unexpectedly of syncope nine days after the accident.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
				Sundries Underground—continued.			
1892	Sept. 8	140	Rhosydd	John Charles Williams.	Labourer	17	Williams and another man were working in the middle of a flat ledge of rock, 15 to 20 feet wide, with a precipice 40 feet deep on one side. Williams got up to leave the ledge and somehow fell over the edge of the precipice and was killed. The work of getting the slate was being carried on in an unusual fashion, more dangerous than ordinary methods.
1893	May 31	144	Braichgoch	Owen Jones	Rockman	56	He was startled by a falling chain, and while walking backwards rapidly along the floor of the chamber, stumbled and fell against a waggon loaded with slate rubbish which was standing in the tram road. The blow caused a bad scalp wound and concussion of the brain, and he died from these injuries nine days afterwards.
				On Surface.			
				By Machinery on Surface.			
1875	Dec. 9	10	Holland's	Edward Roberts	Quarryman	21	The waterwheel working the machinery at which the deceased was engaged dressing slates had, as he thought, become firmly fixed by ice, and wanting to set it free he rashly jumped upon the top of the wheel. His weight at once sent it rapidly round, and being unable to get off he was so shockingly crushed and mutilated that he died next day.
1878	Sept. 10	36	Votty and Bowydd	Griffith Roberts	Labourer	50	Crushed between the trunk of a water balance and the top of an aperture through which it had to pass.
1879	Aug. 29	40	Palmerston	Evan Williams	Brakesman	25	The overwinding of some empty waggons on an incline of which the deceased had the charge.
„	Oct. 22	41	„	J. T. Jones	Slate dresser	15	Dragged into the pulley of a slate sawing machine.
1881	Oct. 19	61	Bryneglwys	Thomas Elias Rodgers.	Engineer	46	He was examining the speed of a vertical turbine shaft, when his coat got caught by it, and he was whirled round, receiving fatal injuries. The shaft was in a walled pit, to which none but special workmen had access.
1889	Feb. 9	124	Oakeley	Owen P. Jones	Mine agent	45	Fall of a crane or triangle, which he allowed to be used with one instead of two guy chains. He was carelessly standing between the legs of the crane.
				Boilers Bursting.			
1882	Jan. 30	70	Maen Offeren	Hugh Hughes William Pritchard Thomas Davies Evan Roberts	Labourer Engineman Carpenter Labourer	66 60 28 52	Boiler explosion.
				Miscellaneous on Surface.			
1875	April 29	2	Welsh Slate	William Roberts Robert Hughes William Hughes	Timekeeper Engine stoker Slate miner	32 30 31	These men were working on the surface, and were supposed to be in a place of perfect safety, but an enormous mass of overhanging rock suddenly gave way, crushing the poor men to pieces, and causing the destruction of much valuable machinery.
„	Nov. 17	9	Cwmorthin	Owen Owens	Quarryman	22	The breaking of a link, whereby a waggon containing slates got loose and went down an incline with terrific speed, killing the poor man and causing much damage.
1877	Jan. 14	16	Votty and Bowydd	William Parry	Slate miner	16	He was leaving his work about 3 p.m., and instead of taking the proper pathway made a short cut, which brought him to the edge of a deep daylight precipice. He there fell over a depth of 25 yards, and received such severe injuries that he died soon after being taken home. His father, who worked with him and who was present at the inquest, stated that he had repeatedly reprimanded the deceased for taking this dangerous path.
„	July 30	22	Maen Offeren	David Evans	„	45	The deceased was injured on the 30th July by a fall of rock which occurred in an open working in the quarry.
„	Dec. 16	31	Bryneglwys	Edward Davies	„	50	The deceased fell about 20 yards from a landing, on which he was engaged with another man receiving trucks laden with slate, as they were hauled up from the mine.
1879	July 2	39	Oakeley Upper	Griffith Wynne	Labourer	24	A blow from a stone which fell from some part of the open quarry while he was tramming.
1880	Aug. 2	47	Abercwmeiddaw	Owen Evans	Quarryman	37	Struck by a stone, which fell on to the floor above him and then rolled over on to the floor where he was standing.
„	Aug. 20	48	Llechwedd	Edward Rowlands	Rockman	26	Sudden explosion of a charge of powder, while in the act of lighting the fuse.
„	Nov. 19	52	Palmerston	Hugh Jones	Labourer	29	He was knocked over by a truck which was allowed to run down an incline.
1881	April 2	62	Bryneglwys	John Watkin	„	25	Fall of earth whilst excavating at the surface for a new reservoir.
„	Dec. 16	63	Palmerston	Hugh Gabriel	„	40	He was pulling a truck with slate across a branch of the Festiniog Railway when a train of slate came down from the Llechwedd Quarry and overturned his truck, which fell on him and killed him.
1882	Jan. 3	71	Abercwmeiddaw	Evan Humphreys	„	18	Fall of a small stone in the open part of the quarry.

List of Fatal Accidents—*continued.*

Year.	Date.	No. of the Accident.	Name of the Mine.	Persons killed.	Occupation.	Reputed Age.	Cause of Accident, and Remarks.
			Miscellaneous on Surface—continued.				
1884	Jan. 25	86	Llechwedd	Lewis Griffith	Attending to a water tank.	26	Against orders he was riding up an incline on the carriage of a water-tank, and after reaching an open part of the quarry he slipped off and was run over.
„	Mar. 10	87	Oakeley Upper	Richard Griffith	Labourer	54	Unexpected fall of a stone from some loose rubbish lying on the slate-rock near his working place, above ground.
„	Mar. 19	8	Diphwys Casson	Henry Jones	Rockman	46	He had charged a hole about 6 feet 5 inches deep with dynamite and powder, and it was lighted at the same time as another hole charged by another man. On hearing one report, Jones rashly concluded that both holes had gone off at the same time, and returned to his hole. It exploded and inflicted fatal injuries on him.
1886	June 26	103	Conglog	David Lloyd Roberts.	„	22	He was riding with several other men on a truck containing slabs. Seeing a stone on one of the rails he jumped off and ran in front of the truck to kick it off. Unfortunately he slipped and fell, and the truck struck him so violently that he died in the course of a few hours.
„	Nov. 24	104	Oakeley Upper	John Tudor Roberts.	Quarryman	69	Fell over a natural precipice, used as a tip close to his working place.
1892	Aug. 19	141	Oakeley	Richard Roberts	Labourer	35	He was working above ground at the foot of the "fall," a huge heap of slate and rubbish, when a stone weighing about a quarter of a ton rolled down and struck him as he was running away to escape it. Another man had proposed to him to roll the stone down, but he had refused, saying he would go on with his work for a bit. The stone soon afterwards came away suddenly. His leg was broken, but although it was a simple fracture, without any complications, acute tetanus set in the day after the accident, and he died on the 23rd August.

APPENDIX VIII.

GLOSSARY of the TECHNICAL TERMS used in the EVIDENCE.

BARGAIN.—The working face of a chamber let to a gang of men on contract.

BENCH.—A narrow ledge of rock by the side of a pillar, for carrying a tramroad from the working face to the original level along the strike from which the chamber was started.

BEVEL.—A clean natural joint in the bed of slate cutting both the bedding and cleavage obliquely.

BIG THICKNESS (Welsh, *Tew Mawr*).—A layer of hard compact rock, also known as the "*Blue hard*," overlying the "Nine inch" at the top of the best known slate bed in the Festiniog Mines, viz., the "Old Vein."

BÔN.—The primary meaning of this word is *Stump*. It has thus come to mean the portion of the bed of slate remaining in the ground when some has been removed. Thus, the face of a quarry where a slate bed ceases to be worked open, and dips under cover, is called the *head bôn*. Similarly, if a bed of slate is worked from below upwards, and then cut across, from geological roof to geological floor, the portion left behind is called the *ceiling bôn*.

The openings into daylight in a *head bôn* are shown in Plate IV., Fig. 7.

CHAMBER (W. *agor*).—A cavern left by the excavation of the bed of slate.

CHERT.—A local term for the compact, light-coloured volcanic ashes which separate some of the different slate beds in the Festiniog district.

CLAY SLANT.—A plane of bedding at the top of the "Old Vein." It is always accompanied by a thin layer of white unctuous clay, generally soft. On the clay slant comes the "nine inch," a band of dark blue, compact ash, and this again is separated from the overlying "*big thickness*" by a second clay slant, which, however, is not always so well defined as the lower.

CLEAVAGE.—The property possessed by slate of splitting into thin layers independent of the stratification.

CODI CERRIG (W.).—To remove from the mill to the "bank" the slates made during the day.

COVER.—The top, roof or ceiling of a chamber. The term is used at Aberllefenny, Bryneglwys, and Corris.

CRANE.—A derrick with a winch, used for hauling blocks from the bottom of the working face and loading them on to trolleys.

FLOOR.—A horizontal surface left by the excavation of the slate.

HARD.—A local term for anything other than slate, it may be a volcanic ash or an intrusive igneous rock.

LABOURER.—An unskilled workman, who clears away the rubbish, &c.

MILL.—The shed where the slate is prepared for the market by means of machinery.

MINER.—The man who drives levels, puts up "roofs," does the "widening," and so prepares the chamber for the slate getter (*rockman*).

NEW VEIN.—The lowermost or most southerly bed of slate worked in the Festiniog district.

OLD VEIN.—The best known, thickest, and most valuable of the Festiniog slate beds. It overlies the New Vein (*see* Plate).

PILLAR.—A partition of slate rock which is left between two underground chambers to support the superincumbent strata.

PILLARING.—The property of rending with comparative ease in a certain direction along planes at right angles to the planes of cleavage.

PLATFORM.—Sometimes used as equivalent to floor.

QUARRYMAN (W. *Chwarelwr*).—A slate-maker, the person who finally splits or dresses the slate for the market.

RAMMER (TAMPER, STEMMER).—A wooden or metal rod for pressing down explosives and the material used for confining the charge, in shot holes.

ROCKMAN (SLATE GETTER).—A skilled workman who excavates or "gets" the blocks of rock, which are split and dressed into slate.

ROOF.—The top or ceiling of a chamber.

ROOF.—The small connecting passage between two floors, which is made as the first operation in opening a chamber.

ROOFING.—Making a connecting passage or "roof."

SCRIBE.—A rent in the slate proceeding in a direction which does not coincide with the cleavage or the pillaring. It is apparently caused in some cases by the pressure of the superincumbent strata, and at other times it is started by blasting.

SHED (W. *Wal*)—A building in which the slate is split and dressed by means of the hand knife.

SLANT.—A smooth, even plane of division in the slate rock, which may coincide with the bedding (*e.g.*, Clay slant) or with the cleavage, or may differ from both.

SLATE.—A fine grained sedimentary rock originally deposited as clay, which now has the property of splitting into extremely thin layers along planes which do not as a rule coincide with the bedding.

STEM.—A day's work.

STEMMER.—*See* "Rammer."

TAMPER.—*See* "Rammer."

THICKNESS (W. *Tew*).—A slice of slate rock between two cleavage planes.

TORI CEFN (W.).—Cutting the rock in a chamber to form walls or pillars. The term is more generally applied to cutting the wall or pillar on the west side of a chamber.

UNROOFING (WIDENING).—Extending sideways, over the whole width of a proposed chamber, the original connecting passage (*roof*) made from one floor to another.

VEIN (SLATE VEIN).—A term generally used for a seam or bed of slate.

WHINSTONE DYKES.—A series of intrusive sheets of igneous rock (Diabase) crossing the bedding of the slate (Plates V. and VI.).

WIDENING.—*See* "Unroofing."

WORKING HOME.—Removing all the slate on a given floor until the underlying rocks are reached.

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Cwmorthin the men have their clothes dried round the boilers underground; *Williams*, 2955-9. It would be wise for the men to have two suits with them, so as to leave one at the quarry; *Roberts*, 4465.

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CRANES:

Accidents with cranes happen for want of stopper or brake; *Hughes*, 266–271. Long rakes are employed at Llechwedd Quarry for clearing rubbish from under blocks in crane; *Hughes*, 275. Most crane accidents happen in lowering the blocks; *Jones*, 812; *Jones*, 2443, 2450. Blows from handle of crane are still prevalent; *Roberts*, 1052. It is desirable to have a brake on cranes; *Griffiths*, 1587–90. There should be some provision for preventing accidents with cranes; *Jones*, 2442-5; *Jones, D. W.*, 3150. Recent head injuries are mostly caused by crane; *Evans*, 1724. Proper pieces of wood should be supplied to put under the blocks in the crane; *Roberts*, 3018–23. Crane handles should fit tightly; *Roberts*, 3024–5. Instances of accidents with crane given; *Jones*, 3151–4. A crane with a worm was abandoned by the men at Llechwedd some years ago, on account of its weight and slow action; *Roberts*, 3589. New safety crane described, 3589, 3602–7. The men would not use a crane with a pawl; *Robarts*, 4009. The construction of cranes has been much improved of late; *Pierce*, 4613–5.

DAVIES, DAVID, Slate Maker, Oakeley Quarries.

Could not say he had suffered from effects of slate dust, 1266. Nearly all accidents he knew of could be traced to absent-mindedness, 1267. The Festiniog Railway Company discontinued use of carriages without doors six or eight years ago, 1271. Men suffered in health from the old carriages, 1272. Present carriages are over-crowded, 1273–5. Arrangement of seats in carriages of Festiniog Railway bad and dangerous to health, 1276. Special rules are very strict and very good, 1279. Recommends that a door be always placed where waste falls from dressing machines, 1284–7. Spray would keep down dust, 1288.

DAVIES, GRIFFITH, Rockman, Oakeley Quarries.

Complains of Special Rule 61; 3464–71. Wants the assistant inspector to be a man who has worked for 10 or 15 years underground, and understands his work thoroughly, 3473, 3483–4. The expense of making the quarry safe should be paid out of the royalty, 3473. The workmen are much divided on the eight hours question, 3478–82. Thinks eight hours a day quite enough for a man to work underground, 3484–7. Chains, and not ropes, are used by the men when the rock is wet, 3489–92. Does not see necessity for a place for drying clothes at quarry, 3494–5. Knows of men who have suffered in health, owing to having worked in wet places, 3502.

DAVIES, ROBERT, Rockman, Oakeley Quarries.

Enumerates most common accidents, 969. Describes method of using long ladders for inspecting roofs, 975–8. Sounding with hammer not always sufficient, 983. Warning of danger from large pieces given by fall of small bits, 986. Light often taken through the quarry to inspect roofs, 1001. Suggests that special official be appointed to attend to dangerous places, 1009–13, 1026. Wants an official to see to each "thickness," 1027. Privies above, but none below ground, 1035–6. Officials attend to complaints, 1043.

DAVIES, THOMAS, Rockman, Llechwedd Quarry.

Desires to see more minute inspection of pillars as the bargains are being worked, 2353. Complains that some of the rules are not applicable to slate quarries, 2355–8. They made their objections to the rules known through their secretary, 2359–62. The copper tampers are used for first tamping only, 2367. Considers the rule as to using lantern to take powder from chest impracticable, 2372. States that the path complained of (2020–4) is a fairly good path, and he heard no one complain of it, 2373–93. Does not think inspections with a light sufficient, 2395. One man is always employed at Llechwedd Quarry to take down what is dangerous, 2397.

DEATHS:

For mean age of quarrymen from various diseases, &c. *see under* JONES, DR. RICHARD.

Deaths from typhus and typhoid fever reduced by eleven-twelfths by the introduction of water from Llyn y Morwynion; *Jones*, 111–3. Deaths might have been avoided if men had been trained in ambulance work; *Jones*, 129. Table of comparative mortality handed in; *Jones*, 2058. Deaths from diseases of the alimentary system, high in the Festiniog district; *Jones*, 2062. Deaths from diseases of the circulatory system low; *Jones*, 2063. Deaths from accidents higher among the Festiniog workmen than among stone and slate quarriers generally; *Jones*, 2062. Ratio of disease to death in the district; *Jones*, 2092. Number and per-centage of deaths from various diseases; *Evans*, 1648. Per-centage of deaths from accidents at Llechwedd; *Roberts*, 3850–2

DISEASES. (*See also under* CONSUMPTION, INDIGESTION, NERVOUS DEBILITY, and PNEUMONIA.)

Diseases of the respiratory organs are high; *Jones*, 52. They assume a low form in the district; *Jones*, 54. Prevalent diseases among quarrymen enumerated; *Jones*, 64; *Roberts*, 1052; *Evans*, 1648. Pneumonia is prevalent in the district; *Jones*, 167. Two cases of typhoid fever could not be traced to anything but drinking impure water at the quarry; *Evans*, 1656, 1690. Emphysema is most common among miners; *Evans*, 1712. Believes many underground men suffer from chronic rheumatism; *Evans*, 1733.

DUST (SLATE):

Slate dust irritates and may lead to chronic phthisis; *Jones*, 54, 59, 143, 162. Is less injurious than granite dust; *Jones*, 144. More dust in summer than in winter; *Jones*, 148, 149. Men often complain of dust; *Jones*, 160; *Jones*, 1302. Effects of inhaling dust described; *Jones*, 2070. Does not believe in watering mills to lay down dust; *Jones*, 658–66. There is much dust in mills in summer; *Owen*, 753. Inhalation of dust, &c. deleterious to health; *Roberts*, 1052, 1075, 1100–2, 1135; *Roberts, J. E.*, 1230, 1231. Inhalation of dust gives rise to irritation, lassitude, and thirst; *Roberts*; 1052. Recommends spray to lay down dust; *Roberts*, 1052; *Davies*, 1288. Respirators and artificial moustaches might do good; *Roberts*, 1052. It would be an advantage to make a post-mortem examination of a

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slatemaker's lung to prove injurious effect of dust; *Roberts*, 1076. It would be a gain to science to have such an examination made; *Roberts*, 1094. The quantity of dust is about the same in the mills as it was in the old sheds; *Roberts*, 1080. Inhalation of dust cannot develop into pneumonia; *Roberts*, 1109, 1110. Quarrymen to avoid the injurious effect of dust should keep the mouth shut and breathe through the nostrils; *Roberts*, 1124, 1125. Has not suffered from the dust; *Davies*, 1266; *Williams*, 4446–8. Dust and smoke account for the disproportion of deaths among males and females in the district; *Evans*, 1648, 1650–1, 1674, 1679. Slate dust is angular; *Evans*, 1682. Pipes for spray to water mill when needed have been fixed at Llechwedd; *Roberts*, 3589.

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ELLIS, WINIFRED A., Lecturer in Cookery under the Merionethshire County Council:

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EVANS, R. D., M.R.C.P., M.R.C.S.

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EVANS, THOMAS, Mineral Agent and Quarry Manager, Barmouth.

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GRIFFITH, EVAN, Manager of Ratgoed and Cymerau:

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GRIFFITH, HUGH, Rockman, Oakeley Quarries:

Recommends there should be inspection of roof of a worked-out chamber before commencing to work the chamber below it, 2312. Gives instance of fall from side of pillar, owing, as he believes, to carelessness, 2315–2329. No particular difficulty in observing Special Rules, 2325 It will take three or four years for a labourer to become a practical rockman, 2328. Recommends frequent periodical inspections by means of Wells Light, 2333. Suggests there should be a special man to carry out this inspection, 2335–6.

GRIFFITHS, RICHARD, Rockman and Slatemaker, Oakeley Quarries:

The chambers become more dangerous the deeper they go, 1411. Explains why this is so, 1412–23. Defines a "scribe," 1424. Rock most liable to "scribe" in lower part of quarry, 1441–3. No cause of complaint for years that the pillars were undercut, 1458. Wants practical man and one with knowledge of Welsh as sub-inspector, 1460, 1461. The way in which the present inspector has performed his duties meets with general approval, 1463, 1464. Explains why sub-inspector should be a "practical man," 1465—71, 1504. Wants one agent at least in each quarry who is an experienced underground workman, 1472–8. Wants periodical examinations by means of ladders once at least in every six months, 1479–84, 1511–15. Suggests that quarry owners should offer prize for the best form of ladder to get at dangers overhead, 1482. Thinks Rule 46 too indefinite, 1491, 1492. Wants to impose the responsibility of examining every "thickness" before it goes out of reach on the management, 1493–1502. Sides of pillars are not being inspected as carefully as they ought to be, 1509. Gives instance of accident through men leaving side of pillar in unsafe condition resulting in death of one and serious injury to another, 1516–20. Falls of rock are more numerous than formerly, 1531. Falls occur generally from places out of reach of the men, 1532. Only one accident from a fall from side of pillar in 1893, 1537–40. Suggests improvements to lessen danger to men on rock after blasting, 1542–51. It would be an advantage to have men on the jury of the same occupation as deceased, 1552–3. Reluctance on part of men to give evidence at inquests and in legal proceedings, 1555–60, 1566–7. 1581–5. Gives instance of reluctance at Welsh Slate Quarry, 1562–5, 1570–3. Recommends erection of walls in middle of disused levels, 1574–80. It would be desirable to have brakes on cranes, 1587–90. Special rules ought to be improved, 1592. Complains of having to use wooden rammer and of having to return powder to chest, 1592. A man must work four or five years at least before he is a practical rockman, 1596. A rockman should have been a slate maker first, 1596. Masters and men suffer from the employment of incompetent men, 1598–601.

HOSPITAL:

No hospital in the Festiniog district for infectious diseases; *Jones*, 80. It is the duty of the local authority to provide such; *Jones*, 81. *Evans*, 1648. There are only two hospitals in the district; *Jones*, 132–134. Men's objections to the hospital are dying away; *Jones*, 139, 140. Men ought to avail themselves more of the hospitals; *Roberts*, 1052. The workmen who meet with accidents at the Oakeley Quarries are maintained at the hospital free of charge; *Roberts*, 1741. The cost of maintaining some Cwmorthin men at the hospital was defrayed by by Mr. Robarts; *Roberts*, 3545. All the expenses of Llechwedd men at the hospital are paid by the company; *Roberts*, 3988–91. The hospital is readily used by the men; *Roberts*, 3994. He should be glad of a hospital where the men could be sent to; *Robarts*, 4013.

HOURS OF WORKING:

The hours of working are reasonable; *Roberts*, 3547. Particulars of hours at Oakeley Quarry given; *Roberts*, 3547–84. Working hours at Cwmorthin; *Jones*, 3133–40; *Robarts*, 4019–21. He finds the day often too short for him to do his work; *Jones*, 3141. The working day is rather long, it would be an improvement to shorten

HOURS OF WORKING—*cont.*

it by one hour; *Jones*, 3186, 3189. The men are called too early to their work, especially in winter months; *Parry*, 3321. Time of commencing and leaving off work at Oakeleys given; *Parry*, 3342–3348. He believes in an eight-hours' day, but not in the law enforcing it; *Roberts*, 3450. The workmen are much divided on the eight-hours question; *Davies*, 3478–82. Eight hours a day is quite enough for a man underground; *Davies*, 3485–7; *Pierce*, 4627. He thinks the men better off now than they would be with eight hours; *Roberts*, 3784–6. Particulars of working hours at Llechwedd given; *Roberts*, 3787–95, 3823, 3824. Thinks eight hours is too short at the quarries; *Roberts*, 3796. He sees no objection to the eight hours if every slate industry at home and abroad adopts it; *Roberts*, 3803. He does not think a man can work eight hours without a break; *Roberts*, 3814–6. Working hours at Bryneglwys; *Roberts*, 4265–71. Working hours at Aberllefenny; *Roberts*, 4534–51.

HOUSES:

Not more than a dozen houses have a damp course in the Festiniog distict; *Jones*, 86. Houses are satisfactory but for want of a damp course; *Roberts*, 1052. Knows of only two or three houses in the district having any pretence of having adopted a damp course; *Roberts*, 1052. The houses are generally comfortable, the defective ones belong to the employers; *Evans*, 1649. Photographs of good and bad houses handed in; *Evans*, 1649. Houses are scarce at Festiniog; *Evans*, 1659. Number, position, and condition of houses at Festiniog; *Maybury*, 4198. Supplies details about the houses complained of by Dr. Evans; *Maybury*, 4198, 4228–44.

HUGHES, EVAN, Miner, Maenofferen Quarry:

Suggests that the men should be allowed to have more powder with them underground than is now the case, 3209–20. Describes the method they employ for inspecting roof and removing loose portions, 3231–43. Has sometimes seen signs of negligence in inspecting pillars, 3244. Is of opinion that record of condition of wall when inspected should be kept, 3253. Considers there should be an inspector under Dr. Le Neve Foster, 3253. At Maenofferen walls erected in disused levels instead of fences, 3269. Dams made to prevent water from passing through cracks to injure the pillars, 3273.

HUGHES, JOHN, formerly Rockman at Llechwedd:

Complains of path at quarry from underground to bank, 199–207. Recommends that paths should be separate from incline, 208. Danger to miners from the way in which the "clay slant and 9-inch" are pulled down, 210–13, 217, 246. Men are not well-informed as regards Special Rules, 223. Believes some of the Special Rules may well be omitted, 229. Rule 73 not practicable, 230—4. Men are not careful enough to examine the rock in their bargains, 251. Thinks the officials should be responsible for safety of bargain, 257. Insufficient light to examine bargains, 258, 259. Every place in which men work should be examined once in every three months at least, 264. Crane accidents happen from want of stopper or brake, 266–71. Long rakes are used at Llechwedd to remove rubbish from beneath block suspended in crane, 275. Wants Government official to reside on the spot and to visit the quarries often, 277, 278. Believes Special Rules conduce to the saving of life, 285. Thinks pillars should be wider at bottom than at top, 296–8. Complains of incompetent men becoming rockmen, 315, 316, 318, 319. Knows instances of men using powder in a day or two after going to work on rock, 321. Wants a man appointed by employers to make periodical inspections of cranes, &c., 326, 330, 331. No privies underground at Llechwedd except in the Old Floor, 337–40. States that men do not give all the evidence they could at inquests and prosecutions through fear, 344–64.

HYGIENE:

Better knowledge of hygiene is needed in the district: *Evans*, 1649. No hygiene is being taught at the schools; *Russell*, 4139. It ought to be taught; *Russell*, 4150. Hygiene is included in domestic economy, which is being taught at the Higher Grade School; *Wilson*, 4177–80.

INCLINE:

Paths should be separate from inclines: *Hughes*, 208. *Jones*, 577–580. *Robarts*, 4016. No stops at the top of the incline during the day at Votty and Bowydd,

INCLINE—*cont.*

but there is a gradient away from the incline; *Jones*, 592–5. Welsh and English notices *re* inclines posted up at the Oakeley quarry; *Roberts*, 1741. No path for men to go to their work in two places at Cwmorthin but along the incline; *Jones*, 2531, 2552. There has been only one accident on the incline at Cwmorthin for many years; *Robarts*, 4013, 4018.

INDIGESTION:

Indigestion is due to the manner in which the quarrymen prepare their tea; *Jones*, 64, 69. Indigestion is caused by tea drinking; *Owen*, 706, 721, 722. Indigestion is the most common complaint among quarrymen; *Roberts*, 1052. Not one half the indigestion is due to tea-drinking; *Evans*, 1710.

INQUESTS:

Men afraid to give all the evidence they could at inquests; *Hughes*, 344; *Jones*, 2550, 2683, 2684. It would be an advantage to have men on the jury of the same occupation as the deceased; *Griffiths*, 1552, 1553. There is reluctance on the part of the men to give evidence at inquests and legal proceedings; *Griffiths*, 1555–60, 1566, 1567, 1581–5. Gives an instance; *Griffiths*, 1561–5, 1570–3. Slate quarry managers should be allowed to attend inquests; *Roberts*, 1741, 1760–63; *Roberts*, 3590. He never sent a witness to attend inquest except at the request of a police officer; *Roberts*, 1930. There should be some provision to protect men who come forward to give evidence at inquests; *Williams*, 1989, 1990. The principal witnesses are spoken to by the authorities; *Williams*, 1999–2002. There should be men on the jury acquainted with deceased's work; *Williams*, 2003; *Jones*, 3302; *Pierce*, 4668; 4669. Quarrymen should have the right to be legally represented at inquests; *Williams*, 2004–10; *Pierce*, 4675. Half the jury being workmen would satisfy the men; *Williams*, 2050, 2051; *Jones*, 3303; *Pierce*, 4670. The men who know most about a case are not called upon to give evidence; *Jones*, 3301, 3309–14.

INSPECTION (GOVERNMENT):

He wants a man with practical knowledge and knowledge of Welsh to be sub-inspector; *Jones*, 1336–9, 1369–71, 1379–86, 1389–91; *Griffiths*, 1463–71, 1504; *Parry*, 3372. The inspection is more efficient now than when there was a Welsh-speaking inspector; *Jones*, 1367. It would be better to have only one inspection under the Metalliferous Mines Regulation Act for the quarries; *Jones*, 1302, 1375, 1376; *Roberts*, 1741; *Williams*, 2041-3, 2122; *Parry*, 3373. He does not think the appointment of a sub-inspector with practical knowledge would conduce to the safety of men; *Roberts*, 1933. Thinks Dr. Le Neve Foster should be assisted by a man having practical knowledge and knowledge of Welsh; *Williams*, 2047. Does not think an assistant inspector could be of any use; *Owen*, 2173. The sub-inspector should be in the neighbourhood of the quarries to raise and climb up ladders &c.; *Jones*, 2694–6; *Roberts*, 3436–9. He objects to a sub-inspector; *Roberts*, 3433, 3434. The sub-inspector should be a man who has worked 10 or 15 years underground; *Davies*, 3473, 3483, 3484. Dr. Le Neve Foster's inspection is efficient in every way as far as witness knows; *Robarts*, 4070. The sub-inspector should be a practical man, and should visit the quarries often; *Roberts*, 4377, 4378. The sub-inspector should have worked underground 20 years, and should understand Welsh; *Pierce*, 4642, 4647, 4654–7.

INSPECTION (BY THE MANAGEMENT, &c.):

Every place in which men work should be examined once in three months at least; *Hughes*, 264. There should be a periodical inspection of cranes, &c. by a man under the employers; *Hughes*, 326, 330, 331. There is no periodical inspection of roofs, &c. at Votty and Bowydd; *Jones*, 494, 495. The underground chambers at the Oakeley Quarries are inspected with Wells light and ladders; *Jones*, 805–7, 833–7; *Jones*, 1393, 1394. Wants periodical inspection of every chamber once at least in every six months; *Jones*, 1313–4; *Griffiths*, 1479, 1484, 1511–15; *Williams*, 2158. Why a record of such inspections should be kept; *Jones*, 1395. Record should be kept; *Williams*, 2153. Frequent inspections should be made by the men and managers; *Roberts*, 1741. Inspection of roofs and pillars at the Oakeley Quarry described; *Roberts*, 1771–7. He knows of no system of inspecting at Llechwedd; *Williams*, 2031. It is part of his duty to inspect the rock; *Owen*, 2172. Frequent inspection should be made by means of the Wells light; *Griffiths*, 2333. A special man should be appointed to carry out the inspections; *Griffiths*, 2335, 2336. He wants to see minute inspection of pillars and bargains while they are being worked; *Davies*, 2353. Does not think inspection with light alone sufficient; *Davies*, 2395; *Owen*, 2404. Describes inspection at Cwmorthin; *Jones*, 2635–9. Inspection of roof at Maenofferen described; *Hughes*, 3231–34. Inspection of cranes at Llechwedd Quarry described; *Roberts*, 3580. Record of inspection kept at Cwmorthin; *Robarts*, 4035. Inspections of roof carried on at Aberllefenny; *Roberts*, 4507–10.

JONES, DAVID, Slate Dresser, Votty and Bowydd:

Wants mills less draughty and dusty, 2766. Proper supervision needed to prevent men meddling with machinery, 2770–6, 2787. Not aware that only one fatal accident had happened to a slate-dresser during the last 19 years, 2777. Believes the mills are being greatly improved, 2778. Knows of few sawing tables without back gearing, 2779, 2780. There is superintendence of machinery, loose pulley and fork to remove belting to each sawing table in the mill where he works, 2789, 2790. Present mills better than the old ones, 2801. Recommends revolving ventilators in roof of mills, 2809. Men eat their dinner in small huts, 2817; and where the saws are being sharpened, 2818. Festiniog Railway carriages overcrowded and badly lit, 2828–30. Gives time of departure and arrival of workmen's trains, 2831–8.

JONES, DAVID, Rockman, Maenofferen:

The workmen often conceal facts rather than accuse any one of blame, 3291–4. Complains of newspaper reports being inaccurate, 3298. The men who know most about a case are often not called to give evidence at coroners' inquests, 3301, 3309–14. They feel that quarrymen should be summoned on the jury, 3302. Would be satisfied if half the jury were quarrymen, 3303.

JONES, DAVID W., Rockman, New Welsh Slate Quarry:

Wants some arrangement to prevent handle of crane from striking men, 3150. Gives instances of accidents with crane, 3151–4, 3180–3. Would prefer round to square pieces of wood to put under slate blocks in crane, 3155. Thinks a greater number of inexperienced men have been taken to work at the New Welsh Slate than at any other quarry, thus causing more accidents, 3160. Thinks the working day underground rather long, 3186. Thinks it would be a great improvement to shorten the working day by one hour, 3189.

JONES, ELLIS, Rockman, Aberllefenny:

The agent has divided some land into small allotments, so that a workman may keep a cow or two, 4699. These allotments are let for moderate rent, 4706.

JONES, HYWEL, Rockman, Oakeley Quarries:

Wants thorough examination of every chamber after miners leave it before rockmen begin to work, 2435, 2436. Wants wall across disused levels, 2437. Gives instance of accident for want of wall, 2438, 2439. Recommends some provision to prevent crane accidents, 2442–5. Crane accidents generally happen in lowering blocks, 2443, 2450. Wants thorough inspection of every "thickness" before it goes out of reach, 2446, 2447. Thinks same special rules should be in force at all quarries, 2463. It would be a very good thing to have certificated quarry managers, 2467, 2468. There should be an experienced quarryman on the staff of every quarry, 2467–72. Finds it difficult at all times to comply with special rule which requires returning bugle to chest, 2480. The men generally approve of the special rules, 2490.

JONES, JOHN, Rockman, formerly at New Welsh Slate (Cwmorthin):

States that at Cwmorthin the pillars were cut down after the chambers had been worked, 2529, 2583–88. No paths for the men except on the incline, 2531, 2552. He used iron rammers, which he knew was illegal, 2535–7. Believes men are often too much afraid of management to come forward and give evidence, 2543–50. Men somehow get to know of intended visits of the inspector, 2538. Recommends that incline should stop working when a man is on it, 2553; or have a

JONES, JOHN—*cont.*

separate path, 2557. Believes there was a rule to this effect at Cwmorthin, 2554. No manholes at Cwmorthin, and where they do exist they are failures, 2558. The men got permission from the agents to cut down the pillars, 2569, 2570, 2619. The steam on the incline prevents the candles from giving the men light, 2579, 2580. Does not believe there are more than two or three pillars at the quarry not cut down in part, 2584. Gives instance of an accident which happened, as he believes, through mismanagement, 2591–605. Believes the great majority of "falls of ground" are from roof or pillars, and not from forebreast, 2611. Thinks there should be some rule to stop the cutting down of pillars, 2625. Describes how and when the rocks were examined at Cwmorthin, 2635–9. Believes there should be a periodical inspection of the chambers by an inspector under Government, 2640. It would be a good thing to have inspection of every "thickness" while within reach, 2648, 2689, 2694. Thinks he knows an instance of a man working in a place known to the management to be dangerous, 2649. Saw the men in one instance try a dam to stop water down rock, but it was a failure, 2676. Men afraid of coming forward to give evidence which might be unfavourable to the company, 2683–84. Wants inspector appointed by Government in neighbourhood of quarries to raise ladders and inspect dangerous portions, 2694–6. Manhole useful if a man is near it, 2722. He had never read the special rules, though he knew he had to obey them, 2726–30. Gives instance of a pillar which had been cut down to 4 yards, 2735–7. Thinks men's clothes should be dried at the quarry, 2738. Was plaintiff in a case against the Cwmorthin Company and unsuccessful, 2741, 2742, 2748. Was dismissed from the quarry, and states why, 2744, 2745–2752. Had seen no privies at Cwmorthin, 2759.

JONES, JOHN, Rockman, New Welsh Slate:

Many accidents are due to carelessness and want of skill, 3110. It takes from three to five years for a man to become a practical rockman, 3117. Would approve of special man to inspect sides of pillars, though he sees no particular need for it, 3122, 3125. Gives working hours in summer and winter, 3133–40. Very often he finds the day too short to do the work he wants to do, 3141.

JONES, JOHN LLOYD, Agent, Votty and Bowydd:

Thinks it would be better if men had powder in larger quantities, 453–5, 467. It would be better to have uniformity in special rules, 456, 478. Examines roof by means of big lamp or paraffin oil on cotton waste, 491. No periodical inspection, but pays all attention to bad places, 494, 495. Carelessness of men causing many accidents, 505. Officials warn men against, and fine them for, carelessness, 506–8. Rockmen are generally taken from the waggon; not equal to those who have been slate makers, 511–3. Every bargain is visited once a day by an official, 516–9. Men tell officials immediately of anything wrong, 522–4. "9-inch" always taken down with adjoining rock, 530–2, 543, 544. Sounding with hammer not always a means of detecting loose rock, 572–5. Advisable that pathway for men should not be on the incline, 577–80. Refuges on incline when used as pathway, 582, 586–8. No stops used on top of incline during daytime, but gradient away from incline, 592–5. Fatal accident to Daniel Roberts explained, 599–610. Fatal accident to three men on incline, 612–6. Man employed to inspect machinery, but no record kept, 618–20. Thinks record would be of no advantage, 625, 626. Worked-out portions of quarry largely used as privies, 628–34. Privies above ground, 635–8. Difficulty in getting men to use privies, 639–41. Drinking-water underground very pure, 649–55. Did not believe in watering mill to lessen dust, 658–66. Good ventilation for miners, 676–8.

JONES, OWEN ROWLAND, Slate Maker, Oakeley Quarries:

Lays suggestions before committee on behalf of a meeting of workmen as to—i. underground dangers, ii. inspection, iii. sanitary laws, iv. inquests, 1296. Men in mills complain of dust, 1302. Want of privy accommodation, 1302, 1353. Suggests that mills should be under the same inspection (Metalliferous Mines Regulation Act). as underground workings, 1302, 1375, 1376. Wants periodical inspection of every chamber at least once in six months, 1313, 1314. By a man under the quarry owners, 1402. Eating-house accommodation insufficient, 1326–8. Describes the eating-houses,

JONES, OWEN ROWLAND—*cont.*

1329–34. Wants a man with practical knowledge, and knowledge of Welsh, as sub-inspector, 1336–9, 1369–71, 1379–86, 1389–91. Complains of the drinking-water, 1339–51. Explains why inspector should have account of accidents from the men apart from the agents, 1354–8. Quotes figures to prove that men who go by rail are healthier than those who reside in the district, 1359–66. The inspection is more effective now than when there was a Welsh-speaking inspector, 1367. Periodical inspections are made at the Oakeley Quarries by means of the Wells light, 1393, 1394. Explains why record of inspection of chambers should be kept, 1395. Thinks special rules should be revised and that the men should have a hand in it, 1398. Thinks all quarries should be under the same special rules, 1400.

JONES, RICHARD, M.D. Edin., D.P.H. Camb.:

Gives mean age at death of quarriers, 6, 14, 15. Explains what he includes in terms "quarriers," 7–9; "labourers," 10; "rockmen," 11. Complains of faulty statistics in registration, and suggests improvement, 7, 16. Gives mean age at death of various classes of quarrymen, 9. Including and excluding deaths from accidents, 26, 27. Gives factors which should be taken into consideration in comparing age at death of men working above and below ground respectively, 16–19. Effect of Festiniog altitude and climate on inhabitants, 21. Mean age at death of those not employed at the quarries in the Festiniog district, 21, 22. Mean age at death of the whole male population, 25. Mean age at death of non-quarrymen seven years higher than that of quarrymen, 28; of merchants, &c., only one year higher, 35–9. Excluding deaths from accidents mean age at death of quarrymen higher by one year than that of non-quarrymen, 40, 41. Number of deaths from all causes and from phthisis in Festiniog district, 41. Compares death-rate of those employed at quarries with that of persons not so employed in district, 43. Figures show fewer deaths from phthisis among quarrymen than among non quarrymen, 43–6, 101. Compares mortality of quarrymen in Festiniog district with that of quarrymen throughout the kingdom, 47. Finds the Festiniog quarryman enjoys longer life than the quarrymen throughout the whole country, 47–50. States he is under the impression that women suffer more than men from consumption, 51, 102, 103. Diseases of the respiratory organs are higher in the Festiniog district than throughout England and Wales, 52. Accumulation of underground water is a source of phthisis, 54, 84. The houses are faulty—have no provision for evaporation of underground water, 54. Deaths from consumption are reduced when there is satisfactory drainage, 54. Diseases of respiratory organs assume a low form in the district, 54. Want of proper ventilation of quarrymen's bedrooms tends to diseases of respiratory organs, 54. Slate dust irritates, and may lead to chronic phthisis, 54, 59, 143, 162. Death-rate from consumption higher among men who work above, than those who work below, ground, 58, 104. Underground man has to contend less than the man above ground with variations of temperature, 62–4. Gives cubic space per man in slate mills, 64. Common diseases among quarrymen enumerated, 64. Indigestion due to manner in which quarrymen prepare their tea, 64, 69. Quarrymen are sober, thrifty, and cleanly, 64. Food for young is better than it used to be, 64. Quarrymen take bread and butter and tea too often, which leads to want of stamina, 64. Recommends that quarrymen should have dinner in middle of day, 65, 66, 68. Quarrymen are well clothed, 69. Barracks are not what they ought to be, 70, 71; are in an insanitary condition, 77. Local board has taken barracks under control, 70. No hospital for infectious diseases, 80; duty of local authority to provide such, 81. Only a few houses in Festiniog with damp courses, 86. Classifies accidents, 87. Accidents from blasting and falls of men tumbling into the quarry less frequent than formerly, 88. Head injuries more numerous, 89, 90. Arrangements of Festiniog Railway injurious to health of men, 91, 92, 96. States time workmen are kept waiting by various railways in the district, 95. It would be an advantage for the men to have a place to dry their clothes in the quarry, 97. Deaths from typhus and typhoid fevers reduced nine-tenths by the introduction of pure water to Festiniog, 111–4. No pollution of the water of the district by quarry drainage, 116–8, 120–2. Litter used to convey the injured, 124. Illness and death resulting from want of keeping the injured warm, 125–7. Deaths might have been avoided if men had been instructed in ambulance work,

JONES, RICHARD, M.D. Edin. D.P.H. Camb.—*cont.*
129. Two hospitals only in district, 132–4. Men's objection to going to hospital dying away, 139–140. Slate dust is less injurious than granite dust, 144. More dust in summer than in winter, 148, 149. It would be an improvement to have ventilators at top of mill, 153, 154. Men themselves often complain of dust, 160. Pneumonia is a prevalent disease in the district, 167. Watering may lay down dust, 170, 171. Men suffer from nervous debility owing to the way in which they prepare their tea, and owing to excessive smoking, 181–3. Cooking better taught in the neighbourhood would benefit the men, 186–8. Only strong healthy boys go to work at the quarries, 189, 190. Death-rate from phthisis is higher among women than in the case of quarriers or non-quarriers, 2053. Hands in table of deaths and of comparative mortality among quarrymen, 2058. Compares the average rate of death from consumption and other diseases of the respiratory organs with that of males throughout England and Wales, and with that of stone and slate quarriers, 2060. Deaths from accidents higher among Festiniog quarrymen than that of stone and slate quarriers throughout the kingdom, 2062. Pneumonia is the most common disease among quarrymen, 2062. Pneumonia is most common among those that work underground, reason given, 2062. Average death-rate of Festiniog quarrymen from nervous diseases lower than that of males in general and of stone and slate quarriers, 2062; higher from diseases of the alimentary system, diseases of the liver, and cancer, 2062. Festiniog workman compares favourably in diseases of the circulatory system, 2063. Death-rate from diseases of the kidney very low, 2063. Effects of slate dust, 2070. More important to prevent accidents than diseases among quarrymen, 2062, 2073, 2074. Hands in table of meteorological readings, &c., 2084. Gives ratio of death to diseases in district, 2092.

JONES, RICHARD, Rockman, Oakeley Quarries:
Enumerates dangers to which rockmen are most exposed, 803. Underground chambers are examined by agents with ladders and Wells light, 805–7, 833–7. Accidents with cranes through carelessness, 809; generally happen in lowering stones, 812. Officials attend promptly to complaints of danger, 822. Accidents with crane generally happen with small blocks of slate, 828. Ladders raised when there is suspicion of anything wrong, 842, 846. Barracks much improved lately, 858. Had had to eat and sleep in same room, 861, 862. Special rules strictly observed at Oakeley quarries by officials and men, 872. He was not allowed to use powder for a month after first going on rock, 885. Believes sounding with hammer enables one to detect dangerous places, 894. A man will become a competent rockman in two or three years, 902. Did not believe change from farm to quarry affected his health, 927. Much waiting for L. & N.-W. train some parts of the year, 935, 936. Trains too early on winter mornings; about right in summer, 942, 943, 947. Thinks special rules best rules for the men, 953. Impossible to observe special rules under certain circumstances, 955, 956. Brass rammers used everywhere as far as he knows, 957.

JONES, ROBERT JOSEPH, Slatemaker, Oakeley Quarry.
Suggests ventilators in roof of mills, 2428, 2430.

JONES, THOMAS, Rockman, Votty and Bowydd.
Considers that all chambers should be opened on the true pillaring of the rock, 2496–8. Does not think a proper inspection of the roof can be made with light from cotton waste as used at Votty and Bowydd, 2502. Two men always kept at their quarry to see to dangerous places, 2515.

KELLOW, MOSES, Manager of Park Quarries.
Gives particulars of slate beds at Park, 2967, 2975–76, 3007. Details of methods of working, 2967, 2985–2996. Enumerates the advantages of their filling-up method, 2967. Thinks their method of working might, with modifications, be adopted at Festiniog, 2977. Explains how the filling-up method might be carried out elsewhere, 2977. Meets the objections which might be brought against the system, 2977.

LABOURERS:
Meaning of the term; *Jones*, 10.

LADDERS:
Ladders are raised at the Oakeley quarries when there is any suspicion of danger; *Jones*, 842, 846. Describes the method of using the long ladders; *Davies*, 975–8. Suggests that quarry owners should offer prizes for the best form of ladder; *Griffiths* 1482. Light ladders 15 or 20 yards long are needed for inspecting dangerous places; *Owen*, 2404. Recommends that one man should be set aside at every quarry to inspect ladders, &c.; *Roberts*, 3062–65. He was the first to introduce telescopic ladders into the district; *Roberts*, 3615. Ladders are used for inspecting dangerous places at Bryneglwys; *Roberts*, 4341. At Aberllefenny the ladders are good and placed at an angle; *Pierce*, 4581–83, 4591.

LIGHT:
The light employed in insufficient to examine the bargains; *Hughes*, 258, 259. Light is often taken through the quarry (Oakeley) to inspect it; *Davies*, 1001. He can suggest nothing better than candle light to work by at a moderate cost; *Roberts*, 1868–70. Inspection with Wells light insufficient; *Owen*, 2404. Light from cotton waste used at Votty and Bowydd is insufficient to examine the roof; *Jones*, 2502. The steam incline at Cwmorthin prevents the candles from giving light; *Jones*, 2579, 2580. Magnesium ribbon lamp exhibited; *Roberts*, 3677. He would not advocate electric light for actual working of rock; *Roberts*, 3724. Particulars as to cost of erecting electric light plant given; *Roberts*, 3972, 3973, 3978, 3979.

LOCAL BOARD:
The local board has taken the control of the barracks; *Jones*, 70. Local board should provide a hospital for infectious diseases; *Jones*, 81. Quarterly report of condition of barracks made to the Local Board; *Maybury*, 4198.

MACHINERY:
The machinery is inspected at Votty and Bowydd, but no record is kept; *Jones*, 618, 620. Forks should be used to shift the belting; *Roberts*, 1227. Wheel in front of sawing machine should be faced with an iron plate; *Roberts*, 1255; *Owen*, 2343, 2344. Recommends a door where the waste falls from the dressing machine; *Davies*, 1284–7; *Williams*, 2036, 2037; *Owen*; 2343, 2348. The boilers at the Oakeley quarry are insured; *Roberts*. 1741, 1764 1766. Wants a proper place to stand on while adjusting belting in mills; *Williams*, 1948; *Parry*, 3364. Machinery at Oakeley quarry inspected and record kept; *Owen*, 2181–3, 2264–6. There should be proper supervision to prevent the men from meddling with the machinery; *Jones*, 2770–6, 2787. There are some sawing machines without back-gearing; *Jones*, 2779–80. Gives instance of fatal and non-fatal accident with machinery; *Parry*, 3365–9. No man is expected to repair his own machinery at Llechwedd, there is a special man for it; *Roberts*, 3947–51. The machinery is always stopped while preparations are being made to put belting on pulley; *Roberts*, 3952.

MANAGERS:
Managers should be certificated; *Evans*, 374. Should visit all working places daily and make a record; *Evans*, 374. Managers as a rule examine the "roof" before the miners leave it; *Owen*, 446. Wants to impose the responsibility of examining every "thickness" on the management; *Griffiths*, 1493–1502. All managers in future should be certificated; *Roberts*, 1741, 1908, 1910; *Owen*, 2261–3; *Roberts*, 3872, 3880–82, *Roberts*, 4003. He would include practical experience in the qualifications for a certificate; *Roberts*, 1930. It would be a good thing to have all managers and assistants certificated; *Jones*, 2467–8. There should be an experienced quarrymen on the staff of each quarry; *Jones*, 2467–72. Managers should be prosecuted by the men when they do wrong; *Roberts*, 3425. A manager should have worked 5 years underground; *Roberts*, 3431, 3432. Managers should not allow men to work in dangerous places; *Roberts*, 4373–5.

MAYBURY, HENRY PERCY, Surveyor to the Festiniog Local Board.
Gives number, position, and condition of houses in the Festiniog district, 4198. Describes the sanitary arrangements of the houses, 4198. Supplies details concerning houses complained of by Dr. Evans, 4198, 4228–44. The barracks are periodically inspected and registered 4198. No room will be approved which is living and sleeping room, 4198. 300 cubic feet per man are insisted upon in barracks, 4198, 4213. Describes the beds used by the men in barracks, 4199–4204. Two men

MAYBURY, HENRY PERCY—*cont.*

allowed to sleep in a bed, 4205. Privies in quarries are not looked after by sanitary authority unless in connexion with houses, 4218. Not his duty to inspect the quarries from an occupation point of view, 4227. More cases of diphtheria in the houses described as "model" houses than in those said to be unfit for habitation, 4245. Attends to sanitary condition of mills in the town as they are close to the houses, 4253–56.

MEDICAL ATTENDANCE:

The medical attendance on the men and their families in the Festiniog district described; *Roberts*, 1062, 1063, 1086–88. The medical attendance at Aberllefenny described; *Pierce*, 4603–6. The medical man at Aberllefenny is practically chosen by the workmen; *Pierce*, 4609.

MILLS:

Cubic space per man given; *Jones*, 64. The mills should be properly roofed and ventilated; *Williams*, 1948. They should be watered in hot weather; *Owen*, 2345. They should be less draughty; *Jones*, 2766. They are being greatly improved; *Jones*, 2778. The present ones are much better than the old ones used to be; *Jones*, 2801. They should be rain-proof; *Parry*, 3359. In the town the mills are attended to by the local authority as they are near the houses; *Maybury*, 4253–6. The mills are only middling waterproof at Bryneglwys; *Roberts*, 4455.

MINERS:

There is danger to the miners from the way in which the "Clayslant" and "9-inch" are being taken down; *Hughes*, 210–3, 217, 246. They take down the "9-inch" with the adjoining rock; *Jones*, 531–2, 543, 544. The term miner defined; *Pierce*, 4661.

MORRIS, WILLIAM, Rockman, Oakeley Quarries:

Scribing increases with depth; ascribes it to pressure, 1612–22. Suggests making dams to prevent water from trickling along face of rock, 1628–35. Complains of the drinking-water underground, 1642. The eating-houses are very good, 1643.

NERVOUS DISEASES:

They are to a great extent brought about by the way the men have of brewing their tea and by excessive smoking; *Jones*, 181–3. The death-rate from nervous diseases among the Festiniog quarrymen is lower than that of males in general, and lower than that of stone quarriers throughout England and Wales; *Jones*, 2062.

NURSING:

Trained nurses should be engaged; *Roberts*, 1052; *Wilson*, 4176. Nursing is in a very backward state in the district; *Roberts*, 1066. Should be taught at school; *Russell*, 4132, 4148. Nursing should be taught at the intermediate schools; *Ellis*, 4752.

OFFICIALS:

Officials should be held responsible for the safety of the bargains; *Hughes*, 257. Wants an official appointed by the employers to inspect cranes, &c. periodically; *Hughes*, 326, 330, 331. Officials fine men for carelessness; *Jones*, 506–8. The officials visit every bargain once a day; *Jones*, 516–9. They are told immediately by the men of anything wrong; *Jones*, 522, 524. They prosecute men for breach of special rules; *Owen*, 779. The officials attend immediately to any complaint of danger; *Jones*, 822; *Davies*. 1043. Special official should be appointed to attend to dangerous places; *Davies*, 1009–13, 1026. He approves of the appointment of an official to examine the sides before they go out of reach; *Williams*, 1203. Special official for examining every "thickness" not needed; *Roberts*, 1889–96.

OPENINGS (*see* CHAMBERS).

OWEN, JOHN, Slate Maker, Oakeley Quarries:

Had not suffered from any illness on account of his occupation, 699–701. Suffering from indigestion, which he attributes to tea-drinking, 706–22. Men have eating-houses, 727. Eating-houses and preparation of tea described, 728–32, 739, 740. Knows of no convenience at quarry for drying clothes, 734. Not allowed to leave wet clothes in eating-houses, 738. Asked by manager to give evidence, 748. Much dust in mills in summer, 753. Knew of no accident that could have been avoided by more care on part of men or officials, 762, 763. Some

OWEN, JOHN—*cont.*

accidents are due to thoughtlessness on the part of the men, 765–70. Could suggest no improvement in special rules, 775. Officials prosecute men for breach of rules, 779. Knew of no privies in open part of quarry, 780, 781. Drinking-water in Oakeley quarries good, 789, 790.

OWEN, JOHN, Slate Maker, Oakeley Quarries:

Recommends a door behind the dressing machines, 2343, 2348. Wheels in front of sawing machines should be covered, 2343, 2344. Mill should be watered in hot weather, 2345. Eating-houses are all that could be desired, 2345.

OWEN, JOHN, Rockman, Oakeley Quarry:

Thinks there should be a light ladder, 15 or 20 yards long, for examining dangerous places, 2404. States why he thinks inspection with Wells light, insufficient, 2404. Would like to see wall instead of fence in middle of disused levels, 2405. Wants more superintendence over men with the ropes and chains, 2407–10, 2412. Wants some one well acquainted with the work to examine the working places oftener, 2413–7.

OWEN, RICHARD, Rockman, Votty and Bowydd:

Approves of present special rules, 404. Wants present restrictions, as to storing explosives, removed, 404–19. Not aware that in several quarries in the district the powder was allowed in 25 lbs. kegs, 420–2. Managers, as a rule, examine "roof" before miners leave it, 446.

OWEN, WILLIAM, Agent, Oakeley Quarries:

Believes danger increases with vertical depth of wall, 2168. Considers it part of his duty to inspect the rock as well as superintend the men, 2172. Did not think an assistant inspector could be of any use, 2173. Thinks special rules sufficient, 2176. The chief engineer inspects ropes and machinery periodically, and makes a record, as witness believes, once a month, 2181–3, 2264, 2266. The foreman carpenter inspects bridges, 2185, 2186. Considers Rule 73 impracticable, 2204. Believes it would be advisable to have uniform special rules throughout the district, 2207. Approves of quarry managers being certificated. Would include practical and scientific knowledge, 2261–3. A manhole is invariably provided for the safety of the men after blasting, for the first "thickness" or two, 2268. Gives evidence rebutting what was stated in answer to questions (1562–6 and 1570–3), 2283–5. Not aware of a single fall of ground through carelessness in the Oakeley quarries for the last 17 years, 2285. Did not see the use of a wall in middle of disused levels, 2290. No fall from roof for the last three years, 2295.

PARK QUARRY:

Slate beds at Park described; *Kellow*, 2967, 2975, 2976, 3007. Gives details of method of working at Park; *Kellow*, 2967, 2985–2996. Enumerates the advantages of the method employed at Park; *Kellow*, 2967. Meets objections which may be raised against the method, 2977.

PARRY, JOHN, Slate Maker, Oakeley Quarries:

Complains that the men are called too early to their work, especially in winter months, 3321. Gives time of commencing and leaving off work, 3322–9. Believes eight hours a day quite enough for any man to work in the quarry, 3330–6. Thinks spring the best time of all to work at quarry, 3339. Of opinion that the hours of labour have increased here lately, 3348. Thinks the mills should be rain-proof, 3359. Complains of having to stand on a plank 10 inches wide to adjust belting when machinery is in motion, 3364. Gives instance of a fatal accident with machinery, 3365–8; and of a non-fatal one, 3368, 3369. Thinks there should be a special Act of Parliament and special inspection for quarries of North Wales, 3370, 3371. It would be desirable to have a sub-inspector to help the present inspector, 3370. It would be an improvement to have all parts of the quarry under one Act only, 3373.

PATH:

The path at Llechwedd complained of; *Hughes*, 199–207. Paths should be separate from inclines; *Hughes*, 208; *Jones*, 577–80; *Roberts*, 4016. The paths are not good enough, and gives instance at Llechwedd; *Williams*, 2013–26. The path complained of (2018–26) fairly good; *Davies*, 2373–93. No paths in some parts at Cwmorthin, but on incline; *Jones*, 2530–2, 2552–7. The evidence given concerning paths at Llechwedd corrected; *Roberts*, 3590, 3758–61. Wider and more even paths needed at Aberllefenny; *Pierce*, 4569, 4574–90.

PHTHISIS (*see under* CONSUMPTION).

PIERCE, EVAN M., Rockman, Aberllefenny:

Suggests wider and more even paths, 4569, 4574–90. Ladders good, and at an angle, 4581–3, 4591. Wants ambulance appliances at the quarry, 4569, 4592. Thinks enforcing Rule 34 Coal Mines Act would be a very good thing, 4594. Does not think ambulance classes would do any harm; they might do good, 4596–8. Not aware they have any ambulance appliances at quarry, 4601. They have a medical man and pay him 1*s.* a month, 4603–6. The medical man is practically chosen by the workmen, 4609. Majority of accidents are owing to carelessness of men themselves, 4611. Construction of cranes has been much improved during last few years, thus diminishing accidents, 4613–5. Suggests that no steps be left on side of pillar on which rubbish can settle, 4617. No eating-houses. General feeling of the men in favour of having some, 4619–23. Eight hours a day, especially underground, is quite sufficient, 4627. Thinks the men could do as much in eight hours as they can now do in 10 hours, 4632. Eight hours quite as much as a man's body can stand without suffering from it, 4633. The assistant or sub-inspector should be a man who has worked underground for 20 years, and understands Welsh, 4642–7, 4654–7. A man should work underground five or six years before having a bargain, 4652. Defines "rockman," "quarryman," and "miner," 4658–62. The men want practical quarrymen as jury on coroners' inquests, 4668, 4669. Half the jury being quarrymen would meet their case, 4670. Recommends that men should have the right to be represented at inquests, 4675. Believes the men as well as the managers should be compelled to observe the Special Rules, 4684. Knows only of one accident at Aberllefenny from fall of roof, 4688.

PILLARS:

The pillars should be wider at the bottom than at the top; *Hughes*, 296–8. Has heard no complaint of the pillars being undercut for years; *Griffiths*, 1458. The sides of the pillars are not inspected as carefully as they should be; *Griffiths*, 1509. The methods of inspecting the pillars at the Oakeley Quarry described; *Roberts*, 1771–6. The width of the pillars is left to the discretion of the manager; *Roberts*, 1913–21; *Roberts*, 3859–61; *Robarts*, 4109. The danger of the pillars increases with their vertical depth; *Owen*, 2168. The pillars were cut down at Cwmorthin after the chambers were worked out; *Jones*, 2529, 2583. The men got permission from the agents to cut them down; *Jones*, 2569, 2570, 2619. There are not more than two or three pillars at Cwmorthin which have not been undercut; *Jones*, 2584. Gives instance of a pillar cut down to a width of 4 yards; *Jones*, 2735–7. Would approve of special man to inspect the pillars; *Jones*, 3122–5. A record of the condition of each pillar should be kept; *Hughes*, 3253. It is the duty of the surveyor to report if any pillar is undercut, and nothing of the kind is done now; *Robarts*, 4004. It would be an advantage to have the pillars cut by machinery; *Roberts*, 3611, 3612. No steps should be left on the sides of the pillars on which rubbish can stand; *Pierce*, 4617.

PNEUMONIA:

Pneumonia is a prevalent disease in the Festiniog district; *Jones*, 167. Is the most common disease among quarrymen; *Jones*, 2062. Most prevalent among those working underground; reasons given; *Evans*, 1652, 1689; *Jones*, 2062. It is often brought on by men working while suffering from a cold; *Evans*, 1663, 1664.

POWDER. *See under* EXPLOSIVES.

PRIVIES:

None underground at Llechwedd, except on old floors; *Hughes*, 337–40. The worked-out portions are largely used for privies at Votty and Bowydd; *Jones*, 628–34. There are some above ground; *Jones*, 635–37. Finds a difficulty in getting the men to use the privies; *Jones*, 639–41. He knew of none in the open parts of the Oakeley Quarry; *Owen*, 780, 781. There are some above ground but none below, at the Oakeley Quarries; *Davies*, 1035, 1036. Privies should be provided at the quarries, and the men should be compelled to use them; *Roberts*, 1052. None underground at the Oakeley Quarries, but old, disused chambers used; *Williams*, 1155–7. There are no proper privies where he works; *Roberts*, 1243, 1244.

PRIVIES—*cont.*

The privy accommodation is inadequate and filthy; *Evans*, 1648. The number of privies at the Oakeley Quarry given; *Roberts*, 1741. There are none underground; *Roberts*, 3514. He had seen none at Cwmorthin; *Jones*, 2759. Proper privies should be provided underground; *Williams*, 2960–3; *Roberts*, 3455. There are 13 in all at Llechwedd and always flushed; *Roberts*, 3589; and one underground always flushed; *Roberts*, 3913. The privies at the quarries are not looked to by the sanitary authority unless in connexion with houses; *Maybury*, 4218.

QUARRIERS:

What the term means; *Jones*, 7–9; *Jones*, 513.

QUARRYMEN:

Mortality among quarrymen compared with that of other classes (*see under* Dr. Jones). They are sober and cleanly; *Jones*, 64. Sober; *Roberts*, 1132; *Roberts*, 1939. They are highly moral and temperate; *Evans*, 1649. The term "quarryman" defined; *Pierce*, 4658.

RAILWAYS:

Arrangements of the Festiniog Railway injurious to the health of the men; *Jones*, 91, 92, 96. The time the men are kept waiting by various railways in the district given; *Jones*, 95. There is much waiting with the London and North-Western Railway some parts of the year; *Jones*, 935–6. Travelling long journeys by rail every day must be injurious to the health of the men; *Roberts*, 1052; *Evans*, 1648; *Robarts*, 4023. The Festiniog Railway discontinued using carriages without doors eight years ago; *Davies*, 1271. Men suffered in health from the old carriages; *Davies*, 1272. The present carriages are overcrowded; *Davies*, 1273–5; badly lit, badly ventilated, and dirty; *Williams*, 2123, 2124, 2129–31; *Jones*, 2828–30; *Williams*, 2869–70. The arrangement of the seats is bad; *Davies*, 1276. The men who go by rail are healthier than those who reside in the district; *Jones*, 1359–66. Dimensions of the Festiniog Railway carriage given; *Evans*, 1648. The workmen have special cheap tickets; *Williams*, 2872, 2873. Railway travelling is not injurious to the health of the men; *Williams*, 2938.

RAMMERS (*see under* TAMPERS).

REGISTRATION:

The registration is faulty; *Jones*, 7, 16. The registrars do not classify sufficiently those men employed at the quarries; *Roberts*, 1052.

ROBARTS, NATHANIEL F., Managing Director of New Welsh Slate Company, Limited:

Suggests that slate quarry managers be certificated in future, 4003. Enumerates subjects for certificate, 4003. Accidents at his quarry considerably above average, 4003. Gives causes of fatal accidents for last four years, 4003. Corrects a statement made by John Jones concerning compensation to relatives, 4003. Classifies the non-fatal accidents, 4003. Accounts for the numerous accidents at his quarry by nature of the ground, 4003. Gives rainfall at his quarry, 4004. Pillars were cut down before formation of present company, 4004. Barriers in one or two places left by old company to prevent falls from higher to lower workings efficacious, 4006–8, 4025. Men would not use a crane with pawl introduced some years ago, 4009. Men provide their own chains, and are not careful enough with them, 4009. Fuse sometimes bad, possibly kept too long, 4009. Special gang of men employed for inspecting roofs, 4013, 4034, 4073. Buys best candles, finds them the most economical, 4013. All new trucks to be steel with four bars, 4013. Only one accident on the incline for many years, 4013, 4018. Should be glad to have a hospital where he could send the men, 4013. They give the men assistance to be nursed at home, 4013. They have three barracks, which will probably be converted into cottages, 4014, 4015. Better to have paths separate from incline, 4016. Gives hours of working at his quarry, 4019–21. Thinks travelling by train daily injurious to the men, 4023. Thinks it would be an advantage if all the quarries in the district had the same Special Rules, 4032. Difficulty in enforcing rules. Only nominal fine inflicted lately in case of prosecution, 4033. Record of all inspections of roof kept since they adopted the Special Rules, 4035. Company supply chains, but do not see how often they are renewed, 4036. Their bridges have under-trusses, —no suspended ones, 4037–9. One dining-room for the lower mill; appreciated by the men, 4040–2.

ROBARTS, NATHANIEL F.—*cont.*

Wages of men, 4061, 4063, 4066. Dr. Foster's inspection is, as far as witness knows, efficient in every way, 4070. Care is taken by the managers to see that the bargains are safe, 4072–8. Does not approve of management examining every "thickness" if that means their being held responsible for causes beyond their control, 4082–4. Explains what he means by Rule 4, 4085. Prefers leaving responsibility of examining every "thickness" on manager, 4093. Thinks examining all roofs periodically by means of ladders is commercially impossible on account of expense, 4096–4100. Would not fix a minimum width for pillars, 4109. Afraid the expense of examining roof every three months would be too great, 4121–3.

ROBERTS, C. WARREN, Manager, Llechwedd Quarry:

Falls from working faces of bargain can be best prevented by the men, 3589. Falls from roof and pillars require special arrangements, 3589. Describes his proposed apparatus for examining roof and for facilitating removal of rock from unsafe roof, 3589. Crane with worm abandoned by men on account of its weight and slow action, 3589. Mentions safety crane which is being constructed, 3589. The men who use the cranes are the best inspectors of same, 3589. Describes arrangements at his quarry for inspection of cranes, &c., 3589. No accident, fatal or non-fatal, from fall from roof or pillar for last four years, 3589. Gives his opinion as to cause of "scribing," 3589. Pipes fixed at his quarry for spray when needed, 3589. There are 13 privies in all above and below ground, constantly flushed with strong flow of water, 3589. Gives analysis of drinking-water at quarry done by Evans, Sons, and Co., Liverpool, 3590. Evidence of one witness concerning paths untrue, and that of another exaggerated, 3590, 3758–61. Agrees with Mr. R. Roberts as to inquests, 3590. Corrects figures given by a previous witness as to sick pay paid to those going by train and residing at Blaenau respectively, 3590–4. Those going by rail receive more sick-pay, 3597. Describes his roof-testing apparatus, 3600. Describes the improvement in the crane, 3602–7. It would be an advantage to have the walls cut by machinery, 3611, 3612. Introduced the first telescopic ladder to the district, 3615. Hands in sketch of trolley used at his quarry, 3616. Describes what he means by "scribing," 3620–6. Not due, in his opinion, to pressure, 3627, 3628, 3644. Whinstone dykes left at Llechwedd form crossties and are an element of safety, 3655, 3661–3, 3684, 3685. Exhibits a magnesium ribbon-lamp which he uses at quarry, 3677. Electric fan next best to natural ventilation he knew of, 3691, 3692. Hands in copies of notices in force at the quarry, 3694. Uses made of electricity at his quarry, 3703–5. Believes absence of "bôn" is an element of safety in a quarry, 3655, 3656, 3715. Would not advocate electric lighting for actual working of rock, 3724. Advocates technical training in the district, 3740. Suggests laying down of true meridian lines in the district, 3740–2. Had recommended filling-up method at Honister, Cumberland, 3744–7. Certain that filling-up method can not be applied to Festiniog, 3748. Gives reasons, 3749–52. Describes the path complained of, 3762–83. Thinks the men better off now than they would be with eight hours, 3784–6. Gives particulars of hours of working at Llechwedd, 3787–95, 3823, 3824. Thinks eight hours too short at quarries, 3796. Would have no objection to eight hours if general at home and abroad, 3803. Does not think men can work eight hours without a break, 3814–6. Finds the fuse sometimes very bad, 3829, 3830. Thinks fuse may deteriorate by keeping, 3831. Has been prosecuting for breach of Special Rules; now has the men to subscribe to sick fund or go before justices, 3836–42. Thinks it would be an advantage for all to have the same Special Rules, 3844. Special Rules generally very good, 3845. Gives per-centage of deaths from accidents at Llechwedd, 3850–2. Determining width of pillars should be left to discretion of managers, 3859–61. Thinks Special Rule 48 relating to pillars excellent, 3868. Thinks it desirable that managers and assistant managers should be certificated, 3872, 3880–2. Practical knowledge specially useful to sub-managers, 3891. How his bridges are constructed, 3895. There is a special man for examining bridges, who reports, 3911–2. Privies underground, 3913. The men do not use them, 3916–7. The bargain taker is the man to examine every "thickness," 3918–21. Special man to repair machinery, 3947–51. Places found to be dangerous are directly

ROBERTS, C. WARREN—*cont.*

stopped, 3959. Large number of ambulance books in Welsh language distributed at the quarry, 3961–4. Gives particulars as to cost of fixing electric light plant, 3972, 3973, 3978, 3979. Gives loss of power by various methods in transmission, 3974. Much available water-power running waste in district every day, 3982, 3983. Uses to which electricity can be applied, 3984–6. Hospital for quarry, all expenses paid by Company, 3988–91. Readily used by men, 3994. They have arrangements to send the men to convalescent homes, 3997. Oakeley and Greaves' quarries the only two having hospitals, 3998.

ROBERTS, HUGH, Rockman, Bryneglwys:

Three out of every four accidents happen owing to carelessness of men themselves, 4366–9, 4427. Thinks workman should take care of his bargain, independent of manager, 4371–2. Thinks manager should not allow men to work in dangerous places, has not seen a manager press a man to do so, 4373–5. Inspector should be a practical man, and should visit the quarry often, 4377–8. Believes the men work as much now in five as they did formerly in six days a week, 4382–6. The men working outside are the healthier, 4390. Thinks their small allotment system would be an advantage to quarrymen generally, 4393–5, 4406. The journeymen's wages have been advanced, which has done away with the feeling that prevailed among them against the five days a week, 4411–6. Gives details respecting certain accidents, 4417–23.

ROBERTS, JOHN, Rockman and Miner, Oakeley Quarry:

Does not believe a copper rammer to be an improvement on the iron one, 3418. Does not believe the Special Rules forbid iron rammers altogether, 3419. Thinks the men should prosecute the managers when they find them do wrong, 3425. Thinks colliers more straightforward than quarrymen, 3427. Would make it a condition in the appointment of a quarry manager that he shall have worked at least five years underground, 3431–2. Objects to a sub-inspector under Government, 3433. Sub-inspector should be a man to climb up ladders to see to safety of pillars and top, 3436–9. Prefers without a wall in disused levels, unless it be a yard wide, 3448–50. Believes in an eight-hours' day, but not in the law enforcing it, 3450. Thinks privies should be provided, 3455.

ROBERTS, JOHN ELLIS, Slate Maker, Oakeley Quarries:

Thinks number of accidents would be lessened if men dress themselves in a manner suitable to their work, 1226. Suggests that proper forks be used to remove the belting from one pulley to the other, 1227. Believes slate dust to be detrimental to health of workmen, 1230–1. Water-supply good where he works, 1235. Eats at other place than eating-house on account of the way in which the men prepare tea, 1240. No proper privies where he works, 1243–4. Older men invariably wear flannel, younger men neglect it, 1246. The men are well clothed, 1247. Same shirt worn night and day for a week or a fortnight, 1248–50. Recommends proper place to change and dry wet clothes, 1252. The wheel in front of sawing table is now faced with an iron plate, 1255.

ROBERTS, MEYRICK, Manager of Bryneglwys Quarry:

Gives position of Bryneglwys Quarry and method of working; rent of houses; division of company's property in the village so that each man has land enough to keep cow or two; two barracks at quarry, cheap workmen's train Monday morning and Friday evening; men work five days a week, and earn wages equal to those working six days at other quarries, 4261. Gives working hours, 4265–71. Hands in wages book, 4272. Slate makers work at quarry from boyhood, rockmen as a rule are promoted from among labourers, 4276–9. Gives particulars as to accidents at his quarry, 4283–95, 4299–303, 4356–8. Thinks men do nearly as much work in five days as they formerly did in six days, 4297. No periodical inspection, unless they think a place is dangerous, 4303–8. Thinks filling-up method impracticable, 4314–9. Gives details as to men's wages, 4326–36. The men are satisfied with present arrangements, 4337. Practical men with long ladders go to

ROBERTS, MEYRICK—*cont.*

inspect dangerous places, 4341. Never had any accident with explosives, 4342. Thinks the men themselves ought to see to the safety of the top, 4346–8. Could point to none of the men suffering from want of the necessaries of life, 4355.

ROBERTS, MICHAEL, Manager of Aberllefenny Quarry:

As a general rule he finds more danger in a place than the workmen themselves do, 4480. Gives particulars of fatal accident from explosives, 4483–6. Particulars of fatal accident from fall of ground, 4492–4. Makes periodical inspections, 4495–502. Inspection of places out of reach carried on by means of torch lights, lamps, and ladders, 4507–10. Filling-up method quite impracticable at Aberllefenny, 4526–8. Does not think men can do as much work in five days as they can do in six, 4531. Gives particulars of working hours at his quarry, 4534–51.

ROBERTS, ROBERT, J.P., Physician and Surgeon:

Inhalation of dust, smoke, &c. must have deleterious effect on health of quarrymen, 1052, 1075, 1100–2, 1135. Slate dust gives rise to irritation; men complain of lassitude and thirst, 1052. Registrars in the district do not classify deaths with sufficient accuracy, 1052. Enumerates diseases from which quarrymen suffer, and circumstances which render them liable to such, 1052. Desirable that place for drying clothes be provided at quarry, 1052. The men are generally well clothed, 1052. Men wear flannel unchanged for too long a period, 1052–5. Ablutions sadly neglected, 1052. Railway travelling injurious to the men, 1052. Too much tea drinking 1052. Recommends sandwich and tea at quarry, and dinner in the evening, 1052, 1116, 1117. Houses satisfactory but foundations damp, only few having damp courses, 1052. Recommends sanitary accommodation at quarries and means of compelling men to use the same, 1052. Recommends fine spray to lay down dust, 1052. Suggests respirators or artificial moustache, 1052. Accidents materially reduced since introduction of Metalliferous Mines Act, 1052. Most common accidents enumerated, 1052. Expresses opinion that the course prescribed by the St. John Ambulance Association is too extensive, 1052, 1083, 1084. Thinks men ought to avail themselves more of hospital accommodation and trained nurses, 1052. Barracks are close and overcrowded, 1059. Describes system of medical attendance on the men and their families, 1062, 1063, 1086–8. Nursing is very backward in the district, 1066. States what Mrs. Greaves did to support cooking-classes, and doubts if county council cooking-classes get proper support, 1069. Want of thrift among quarrymen's wives, 1071. No post-mortem performed to absolutely prove injurious effect of dust, 1076. Quantity of dust about the same in mills and old sheds, 1080. Had delivered lectures in connexion with the St. John Ambulance Association, 1081. The men have clubs to provide for accident and illness, 1092. Gain to science to examine lung of quarryman who died of phthisis, 1094. Classes slate quarryman's occupation with that of miller, 1104. Inhalation of slate dust cannot develop into pneumonia, 1109–10. Thinks occupation of agricultural labourer healthier than that of quarryman, 1113–4. Quarryman to avoid effect of dust should keep his mouth shut and breathe through nostrils, 1124. Quarrymen as a class are sober, 1132. Refuses to certify weakly boys for admission to the quarries, 1137.

ROBERTS, ROBERT, Manager, Oakeley Quarries:

Nearly half quarrymen of Merioneth employed in the Oakeley Quarries, 1740. Frequent inspection should be made by management and workmen, 1741. Special attention should be paid to Rules 48, 82, 83, and 85. Thinks it impossible to stop falls altogether, 1741. Sixty per cent. of the mountain is removed in mining, 1741. Of opinion that no better method can be employed to meet the circumstances than that employed at Festiniog, 1741. Pressure of mountain above tends to bring about "scribing," 1741. Suggests that the various inspections should be merged into one under the Metalliferous Mines Regulation Act, 1741. Special Rule 73, in his opinion, should be modified, 1741. Gives extent of workings at the Oakeley Quarries, 1741. Gives table of accidents for the last three years, 1741. Expresses opinion that slate quarry managers should be allowed to attend inquests, &c., 1741, 1760–63. Workmen meeting with accidents are admitted to the hospital free of charge, 1741. Welsh and English notices posted up *re* inelines, 1741. Special Rules are much better observed than formerly, 1741, 1897, 1899. Gives list of fines inflicted for non-observance of Special Rules, 1741. The fine money divided among the widows of persons killed at quarry, 1741. Believes all managers in future should be certificated, 1741, 1908, 1910. All boilers are insured, 1741, 1764, 1766. Gives number of eating-houses at the quarry, 1741. Drying clothes not allowed in eating-houses, 1741. Gives number of privies at quarry, 1741. Sufficient supply of drinking-water easily accessible, 1742, 1743. No bad smells in working places, 1747, 3516. All Special Rules qualified by the expression "What is reasonably practicable," 1751. "Platform" defined, 1754–6. "Scribing" increases with depth, 1759, 1857. Thinks that section 48, sub-sec. 8, of Coal Mines Act should be made applicable to slate quarries, 1761–3. There is as much eating accommodation as the men wish for, 1768, 1769. Describes method employed for inspecting roofs and pillars, 1771–6. Hands in account showing cost of securing roof of one chamber, 1777. Considers bridges with trusses the best, 1788. He would sooner work in dust than in damp caused by using spray, 1794. Special Rules are adequate, 1795; are uncommonly good, 1883. Gives Mr. W. H. Barlow's estimate of resistance of slate to pressure, 1819. Can suggest no better light than that of a candle to work by at reasonable cost, 1868–70. The water is more or less piped all the way from reservoir, 1872. Men were recommended to boil the water (*vide* 1339) in season of drought, 1873, 3513. Recommends that same Special Rules be in force in all quarries, 1882. Present Special Rules provide for examining every thickness, 1888. Special official not necessary, as Rule 85 meets the case, 1889–96. Width of walls is left to discretion of management, 1913–21. He would include practical experience in qualification of a manager, 1930. He never sent witness to attend inquest except at request of police officer, 1930. Does not think appointment of sub-inspector with practical knowledge would conduce to safety of men, 1933. Defects in diet and clothing, in his opinion, are not due to the men not being paid enough, 1938. Considers the workmen a very sober class, 1939. Any want of proper clothing must be due to want of thrift at home, 1940, 1941. Gives rebutting evidence *re* drinking water, 3513. Hands in analysis of water by Dr. Stevenson, of Guy's Hospital, 3513. Explains what had been done in way of privy accommodation in the pit, 3513. Hands in table of rainfall, 3513. No privies underground, 3514. Explains why officials got drinking-water from other source than that used by men, 3522–3. Gives details as to source of drinking-water, 3526–31. Several of his under-agents are able to do some dialling, 3537, 3538. Thinks he has power to fine men for breaking Special Rules, 3541–3. Mr. Robarts paid expenses of some Cwmorthin men at hospital, 3544–5. Thinks present hours of working reasonable, 3547. Gives particulars *re* working hours, 3547–84.

ROBERTS, ROBERT, Rockman, New Welsh Slate Quarry:

Many crane accidents occur owing to wood used under blocks being too thin and weak, 3017. Suggests that proper pieces of wood be supplied to the men, 3018–23. Handles of cranes should fit tightly, 3024–5. Suggests that trolleys should have two or four cross bars instead of three, 3025–30. Recommends rakes to clear rubbish from under blocks, 3031–38. Complains that bad fuse are sometimes supplied, 3039–57. Complains of candles with bad smell, 3058–61. Recommends that one man be set aside at quarry to inspect ladders, ropes, &c., 3062–65. Every man who leaves anything dangerous in side of pillar should be fined, 3096. Does not think the men like walls in disused levels, he has seen them pulled down, 3101.

ROCKMEN:

What the term "rockmen" includes; *Jones*, 11; *Pierce*, 4658, 4662. Incompetent men become rockmen; *Hughes*, 315, 316, 318, 319. Rockmen are generally taken from among those who follow the waggon; *Jones*, 511, *Williams*, 1179. Those who have been first working as slate makers make the best rockmen; *Jones*, 511; *Griffiths*, 1596. Dangers of rockmen; *Jones*, 803. A man will become a competent rockman in two or three years; *Jones*, 902; *Williams*, 1181; in four or five, *Griffiths*, 1596; in three or four, *Griffith*, 2328; in three to five, *Jones*, 3117. A rockman

ROCKMEN—*cont.*

should first have had experience at slate making in the mill, *Williams*, 1967–71, 1975–9. A man should be a rockman for five or six years before he should be entrusted with a bargain: *Pierce*, 4652.

ROOF:

The roof is generally examined by the managers before the workmen leave it; *Owen*, 446. The roof at Votty and Bowydd is examined by means of big lamp or paraffin oil on cotton waste; *Jones*, 491. Sounding with hammer is not always sufficient to test safety of roof; *Jones*, 572–575; *Davies*, 983. Sounding with hammer is sufficient; *Jones*, 894. The method of inspecting the roof at the Oakeley Quarry described; *Roberts*, 1771–6. The cost of securing the roof of one chamber given; *Roberts*, 1777. The roof should be examined periodically; *Williams*, 2146. No accident through fall from roof at the Oakeley Quarry for the last three years; *Owen*, 2295. Roof-testing apparatus described; *Roberts*, 3600. To examine the roof with ladders periodically is commercially impossible on account of the expense; *Robarts*, 4096–4100. There has been only one accident at Aberllefenny from fall of roof; *Pierce*, 4688.

RUSSELL, ELEANOR H., Cooking Instructress at the Festiniog Board Schools:

Describes the course of instruction in the cooking classes, 4132. It would be a great improvement if there were classes to teach nursing and cooking for invalids, 4132, 4148. Most of the children get no proper bath, 4132. Suggests that a large room be fitted up as kitchen where girls can be taught cooking and other household duties, 4132, 4150. Gives the classes taking cooking and time given to it, 4133–7. No hygiene taught at the Festiniog schools, 4139. Cookery lessons have already borne good fruit, 4143. Recommends hygiene should be taught, 4150, 4158 Girls take an interest in cooking, 4171.

SCRIBING:

A "scribe" defined; *Griffiths*, 1424; *Roberts*, 3620–6. The rock is most liable to scribe at great depth; *Griffiths*, 1441–3; *Morris*, 1613. He ascribes "scribing" to pressure; *Morris*, 1612–22. "Scribing" is brought about by the pressure of the mountain above; *Roberts*, 1471. It increases with the depth; *Roberts*, 1759, 1857. Gives his opinion as to cause of "scribing"; *Roberts*, 3589, 3627, 3628, 3644.

SPECIAL RULES:

The men are not well-informed respecting them; *Hughes*, 223. Some of them may well be omitted; *Hughes*, 229. Rule 73 is impracticable; *Hughes*, 230–4; *Owen*, 2204. The Special Rules conduce to the saving of life; *Hughes*, 285. He approves of them; *Owen*, 404. They should be the same for all quarries; *Jones*, 456–78; *Jones*, 1400; *Roberts*, 1882; *Owen*, 2207; *Jones*, 2463; *Roberts*, 3844; *Robarts*, 4032. He can suggest no improvement in the Special Rules; *Owen*, 775. Officials prosecute the men for breaking them; *Owen*, 779. They are strictly observed at the Oakeley Quarry by managers and men; *Jones*, 872. He thinks them the best possible rules for the men; *Jones*, 953. They cannot be possibly observed under certain circumstances; *Jones*, 955, 956. They are too exacting in some respects; *Williams*, 1159. Complains of Rules 1165–71; *Williams*, 1166, 1171, 1172. They are very strict and very good; *Davies*, 1279. They should be revised, and the men should have a hand in the revision; *Jones*, 1398. Rule 46 is too indefinite; *Griffiths*, 1491, 1492, 1593–5. They should be improved; *Griffiths*, 1592. Special attention should be paid to Rules 48, 82, 83, and 85; *Roberts*, 1741. Rule 73 should be modified, *Roberts*, 1741; *Williams*, 2111. The Special Rules are being much better observed than formerly; *Roberts*, 1741, 1897–9. Fines are inflicted for non-observance of the Special Rules; *Roberts*, 1741. All the rules, he thinks, are qualified by the expression "What is "reasonably practicable"; *Roberts*, 1751. They are adequate and uncommonly good; *Roberts*, 1798, 1883. He thinks he has power to fine the men for breaking the rules; *Roberts*, 3541–3. He complains of Rules 61 and 73; *Williams*, 2112–21. They are sufficient; *Owen*, 2176. He finds no particular difficulty in observing the Special Rules; *Griffith*, 2325. Some are not applicable to slate quarries; *Davies*, 2355–8. Rule 61 is impracticable; *Davies*, 2372. More rules about ropes and chains necessary; *Owen*, 2410. He finds it difficult always to comply with them; *Jones*, 2490. He never read the Special Rules though he knew he had to obey them; *Jones*, 2726–30. The Special Rules do not forbid using an iron rammer altogether; *Roberts*, 3419. Complains of Rule 61; *Davies*, 3464–71. He has been prosecuting for breach of Special Rules, now he makes the men subscribe to the sick fund or go before the justices; *Roberts*, 3836–42. They are generally very good; *Roberts*, 3845. Rule 48 relating to pillars is excellent; *Roberts*, 3868. Explains how he understands Rule 4; *Robarts*, 4085.

SUB-INSPECTOR (*see under* INSPECTOR).

TAMPERS (RAMMERS):

There are brass tampers used everywhere as far as he knows; *Jones*, 957. Copper tampers are used for first tamping only; *Davies*, 2367. He has used iron-rammer though he knew it to be illegal; *Jones*, 2535–7. He does not think wooden tamper necessary when gunpowder is employed; *Williams*, 2888. Copper tampers are more convenient than wooden ones; *Williams*, 2897. He does not believe a copper tamper is an improvement on the iron one; *Roberts*, 3418.

TEA:

Tea and bread and butter are taken too often, leading to want of stamina; *Jones*, 64. Bad preparation of tea leads to nervous debility; *Jones*, 181–3. Preparation of tea at quarry described; *Owen*, 729–32, 739, 740. There is too much tea drinking; *Roberts*, 1052; *Ellis*, 4755. Too much drinking of badly infused tea; *Evans*, 1710. She is against excess of tea drinking; *Ellis*, 4786.

TEMPERATURE:

The man who works above ground has to contend more with variations of temperature than the man who works underground; *Jones*, 62–4. The temperature underground is more even than above ground; *Williams*, 2861.

THICKNESS:

He wants an official to examine each thickness; *Davies*, 1026. Responsibility of examining every thickness should be placed on the management; *Griffiths*, 1493–1502; *Jones*, 2446, 2447; *Jones*, 2648, 2689–94. He does not approve of the management examining every thickness; *Williams*, 2908, 2909. The examination of every thickness should be carried on by the bargain taker; *Roberts*, 3918–21. He does not approve of the management examining every thickness, and gives reasons; *Robarts*, 4082–4.

THOMAS:

Statement handed in after the meeting at Corris; *Thomas*, page 134.

TREGLOWN:

Statement concerning the possibility of using channelling machines at Festiniog, page 135.

VENTILATORS:

It would be an improvement to have ventilators in top of mill; *Jones*, 153, 154. The ventilation for the miners is good at Votty and Bowydd; *Jones*, 676–8. The mills are ventilated only through the doorways; *Williams*, 2033–5. Recommends ventilators in roof of mill; *Jones*, 2428–30. Recommends revolving ventilators in roof of mill; *Jones*, 2809. Ventilation by electric fan is the next best to natural ventilation; *Roberts*, 3691, 3692. Ventilation of houses of is much neglected; *Ellis*, 4752.

WAGES:

The wages at Cwmorthin; *Robarts*, 4061, 4063–6; at Bryneglwys; *Roberts*, 4326–36. The wages, of journeymen at Bryneglwys have been advanced to make up for the sixth day; *Roberts*, 4411–16. Recommends paying wages weekly; *Ellis*, 4752.

WALLS. (*See also under* PILLARS.)

Walls should be erected in the middle of disused levels; *Griffiths*, 1574–80; *Williams*, 2146; *Owen*, 2405; *Jones*, 2438, 2439. He does not see the use of walls in disused levels; *Owen*, 2290. He does not think the men like the walls, they pull them down; *Roberts*, 3101. Walls in disused levels are built at Maenofferen; *Hughes*, 3269. He prefers without a wall unless it is a yard wide; *Roberts*, 3448–50.

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WATER:

There is no pollution of drinking-water by quarry drainage; *Jones*, 116, 118, 120–22. Water may lay down dust in the mills; *Jones*, 170, 171; *Davies*, 1288. The water for drinking is very pure underground at Votty and Bowydd; *Jones*, 649–55. The drinking-water at the Oakeley Quarry is good; *Owen*, 789, 790. There is a good supply of drinking-water where he works: *Roberts*, 1235. Complains of the drinking-water at the Oakeley Quarry; *Jones*, 1339–51. Suggests dams to prevent the water from trickling down the forebreast; *Morris*, 1628–35. There is a danger of polluting the drinking-water at the quarries; *Evans*, 1648. He attributes numerous cases of English cholera in summer to the drinking of impure water; *Evans*, 1649. Two cases of typhoid fever attributed to drinking impure water at the quarry; *Evans* 1656, 1690. The drinking-water supply is sufficient; *Roberts*, 1742–3. The water at the Oakeley Quarry is more or less piped all the way from the reservoir; *Roberts*, 1872. The men were recommended to boil the water during a season of drought; *Roberts*, 1873, 3513. Gives rebutting evidence respecting the drinking-water at the Oakeley Quarry, 3513. Analysis of the Oakeley Quarry water handed in; *Roberts*. 3513. Analysis of Llechwedd water handed in; *Roberts*, 3590. There are dams at Maenofferen to stop the water down the forebreast; *Hughes*, 3273. Some hundreds of horse-power of water running waste daily at Festiniog; *Roberts*, 3982, 3983.

WILSON, ANNE, Assistant Mistress at the Festiniog Girls' Higher Grade School:

Describes what is being done with cooking in day and evening classes, 4176. Gives certain recipes for making soups and the cost, 4176. Women should be taught soup-making, 4176. Suggests the engagement of trained nurses, as well as the teaching of sick-room cookery and treatment of simple diseases, 4176. Domestic economy, including hygiene, is being taught in school, 4178–80. Cookery lessons have been given for about 14 years, 4186. All children she knows of have a bath once a week, 4187. Gives number and ages of pupils attending evening classes, 4190–94.

WILLIAMS, DAVID G., Slate Maker and Rockman, formerly at Llechwedd:

Recommends that no work be commenced in any chamber unless it has been inspected and found to be safe, 1947, 1948. That no chamber which has been stopped on account of danger should be worked again until it has been inspected and found to be safe, 1947, 1948. Galleries should not be too narrow, 1947, 1948, 1950–2. Sheds should be properly roofed and ventilated, and there should be a safe place for putting belts on pulleys, 1948, 1988. Men should have few years' experience in mill before going to work underground, 1967–71, 1975–9. Thinks a man should begin young in order to understand the work, 1982. There should be some provision for protecting the men who come forward to give evidence at inquests, 1989, 1990. Refers to case where a person was said to have suffered for giving evidence, 1991–8. Principal witnesses at inquests are interfered with by the authorities, 1999–2002. Jury should be men acquainted with the occupation of deceased, 2003. Suggests that the quarrymen should have the right to be represented on inquests as in a coal mine, 2004–10. The roads to be used by the men going to and returning from work are not good enough; gives an instance, 2013–26. Knows of no system of inspecting the rocks at the quarry, 2031.

WILLIAMS, DAVID G.—*cont.*

Only ventilation of sheds is through doorway, 2033–5. Doors at the dressing machines would be an improvement, 2036, 2037. It would be an improvement to have the sheds under one inspector only—the Inspector of Mines, 2041–3. Thinks Dr. Le Neve Foster should be assisted by a man having practical knowledge, 2047. Would be satisfied if half the jury would be practical men, 2050, 2051.

WILLIAMS, OWEN FRANCIS, Slate Maker, Bryneglwys:

Does not suffer in health or convenience from slate dust, 4446–8. The mill is only middling rain proof, 4455. Men eat in weigh-house and joiners' shop, 4457, 4458. Thinks it wise for men to have two suits of clothes—one to leave at the quarry, 4465.

WILLIAMS, WILLIAM, Rockman, Oakeley Quarries:

Some Special Rules want modifying, 2111. Complains of Rule 73, 2112–5. Complains of Rule 61, 2116–21. Suggests same inspector for quarries above and below ground, 2122. Festiniog Railway carriages too small, badly ventilated, and dirty, 2123–4. Carriages lit only with candles carried by the men, 2129–31. Morning and evening arrangements convenient, but not the mid-day ones, 2132–5. Recommends building walls in disused levels, 2146. Roof should be examined periodically, 2146. Record should be kept of every place inspected, 2153. Inspection of roof and walls once every six months recommended, 2158.

WILLIAMS, WILLIAM, Rockman, New Welsh Slate Quarry:

Considers falls from roof, pillars, and forebreast the principal dangers, 2857. Thinks workman underground has the advantage of an even temperature, 2861. Does not think any special provision for drying the men's clothes necessary, 2863. Festiniog Railway carriages overcrowded, 2869–70. Workmen have special cheap tickets, 2872–3. Does not think wooden rammer necessary when gunpowder is employed for blasting, 2888. Copper tampers would be more convenient than wooden ones, 2897. Does not approve of management inspecting every "thickness," it can be best done by the men themselves, 2908–9. The company should be held responsible for safety of rock before it goes out of reach, 2915. Produces figures to prove that travelling by train night and morning is not injurious to health of men, 2938. Men dry their clothes round the boilers underground, 2954–9. Wants proper privies provided underground, 2960–3.

WILLIAMS, W. C., Rockman, Oakeley Quarries:

Only few privies at Oakeley quarries, 1154. None underground but old disused chambers, 1155–7. Special Rules too exacting in some respects, 1159. Complains of rules relating to explosives, 1165–72. Rockmen generally taken from among men who follow the waggon, 1179. Fresh men taken on rock are for two or three years under care of experienced men before they have charge of a bargain, 1181. Considers the bargain taker responsible for keeping his bargain safe, 1183. Knows of accidents which have happened through taking light too near the powder-keg 1189. Accidents through men falling from floor to floor greatly decreased of late years, 1196. Approves of appointment of man by employers to examine the sides before they go out of reach 1202–3. Bridges are better fenced, and old "benches" are done away with, 1208–10.